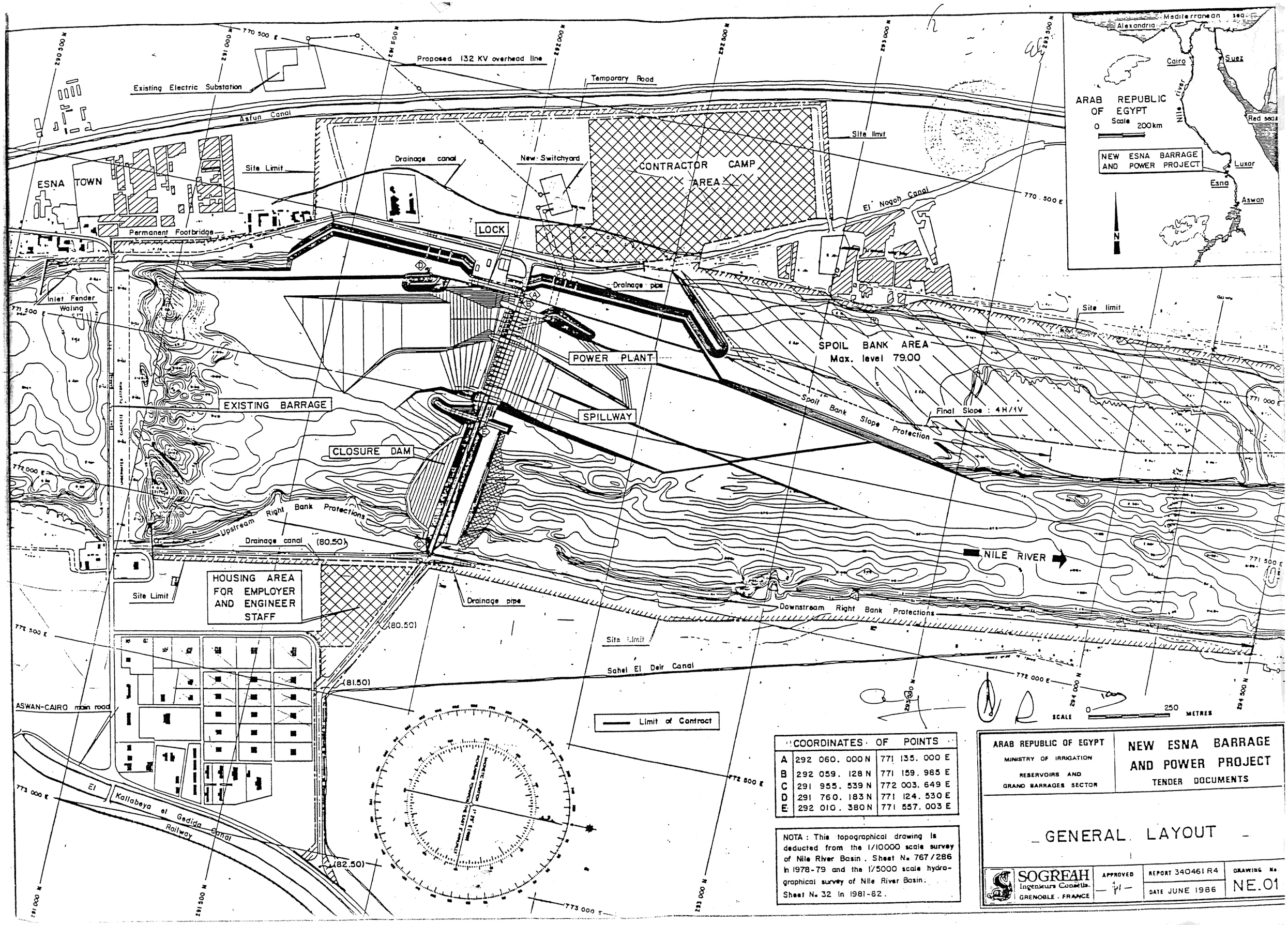


COORDINATES OF POINTS		
A	292 060. 000 N	771 135. 000 E
B	292 059. 128 N	771 159. 985 E
C	291 955. 539 N	772 003. 649 E
D	291 760. 183 N	771 124. 530 E
E	292 010. 380 N	771 557. 003 E

NOTA : This topographical drawing is deducted from the 1/10000 scale survey of Nile River Basin . Sheet N° 767/286 in 1978-79 and the 1/5000 scale hydrographical survey of Nile River Basin. Sheet N° 32 in 1981-82.

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

GENERAL LAYOUT

SOGREAH Ingenieurs Conseils. GRENOBLE . FRANCE

APPROVED

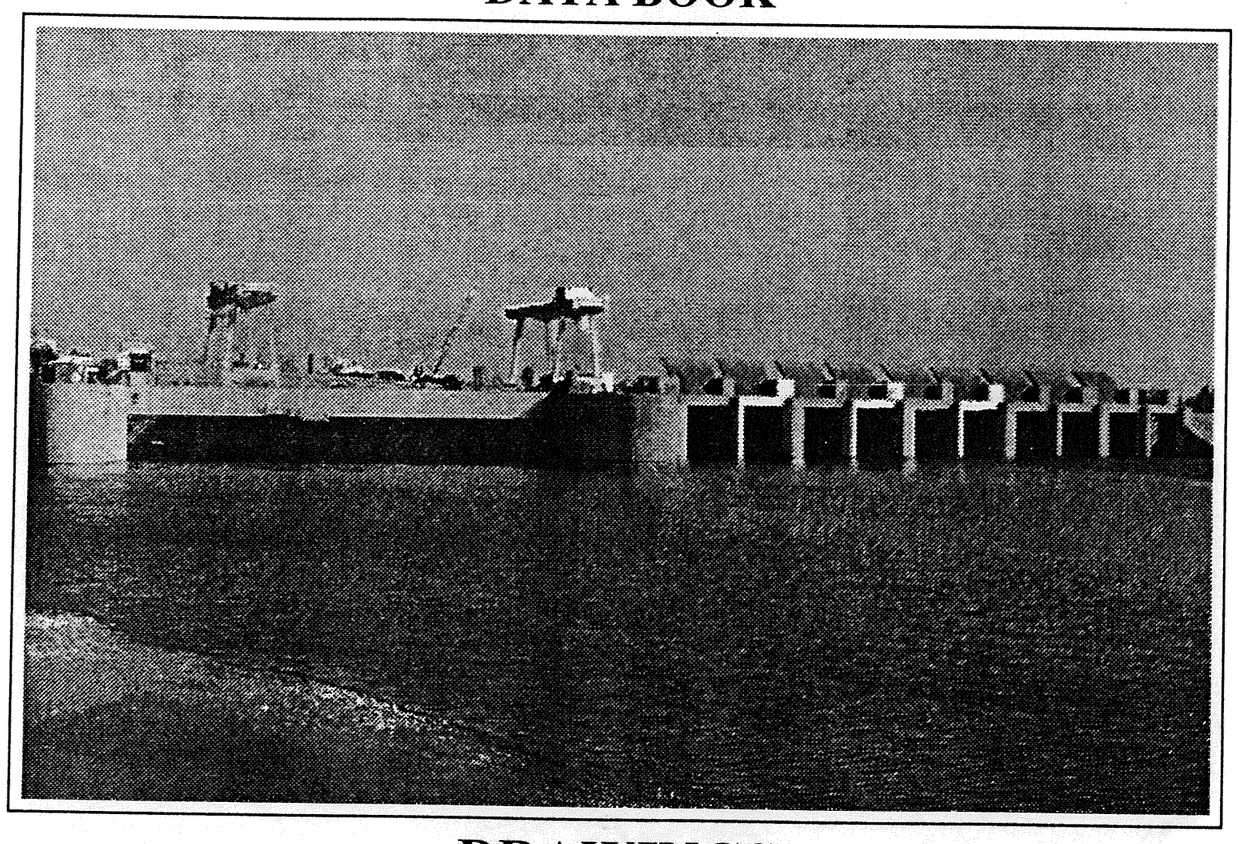
REPORT 340461 R4

DATE JUNE 1986

DRAWING No NE.01

ARAB REPUBLIC OF EGYPT
MINISTRY OF PUBLIC WORKS AND WATER RESOURCES
RESERVOIRS AND GRAND BARRAGES SECTOR
RNPD II - BARRAGE SAFETY MONITORING UNIT

NEW ESNA BARRAGE
DATA BOOK



DRAWINGS
VOLUME II

REVISION 0
JUNE 1995

LIST OF DRAWINGS

CIVIL WORKS DRAWINGS

ME - 01	GENERAL LAYOUT
ME - 02	GENERAL ARRANGEMENT
ME - 03	STRUCTURES - GENERAL PLAN VIEW
ME - 04	EXCAVATION FOR STRUCTURES - No. 1
ME - 05	EXCAVATION FOR STRUCTURES - No. 2
ME - 06	COFFERDAM
ME - 07	FOUNDATION TREATMENT
ME - 08	NAVIGATION LOCK - PLAN VIEW
ME - 09	NAVIGATION LOCK - LONGITUDINAL AND CROSS-SECTIONS
ME - 10	NAVIGATION LOCK - CROSS-SECTIONS
ME - 11	NAVIGATION LOCK - AQUEDUCTS
ME - 12	NAVIGATION LOCK - UPSTREAM WAITING AREA
ME - 13	NAVIGATION LOCK - DOWNSTREAM WAITING AREA
ME - 14	NAVIGATION LOCK - MISCELLANEOUS DETAILS
ME - 15	NAVIGATION LOCK - CONTROL TOWER
ME - 16	POWER PLANT - PLAN VIEW
ME - 17	POWER PLANT - CROSS-SECTIONS
ME - 18	POWER PLANT - PLANS AT El. 56.50 AND 63.50
ME - 19	POWER PLANT - PLAN AT El. 71.00
ME - 20	POWER PLANT - PANS AT El. 73.50 AND 78.00
ME - 21	POWER PLANT - LONGITUDINAL SECTIONS
ME - 22	SPILLWAY - PARTIAL PLAN VIEW
ME - 23	SPILLWAY - SECTIONS AND DETAILS
ME - 24	CONNECTING STRUCTURE BETWEEN LOCK AND POWER PLANT
ME - 25	CONNECTING STRUCTURE BETWEEN POWER PLANT AND SPILLWAY No. 1
ME - 26	CONNECTING STRUCTURE BETWEEN POWER PLANT AND SPILLWAY No. 2
ME - 27	CONNECTING STRUCTURE BETWEEN SPILLWAY AND CLOSURE DAM No. 1
ME - 28	CONNECTING STRUCTURE BETWEEN SPILLWAY AND CLOSURE DAM No. 2
ME - 29	CLOSURE DAM
ME - 30	FINAL CUT-OFF
ME - 31	RIP RAP PROTECTIONS - PLAN VIEW
ME - 32	RIP RAP PROTECTIONS - SECTIONS
ME - 33	METALLIC EQUIPEMENT - RAILINGS
ME - 34	METALLIC EQUIPMENT - LADDERS
ME - 35	METALLIC EQUIPEMENT - STAIRS
ME - 36	MISCELLANEOUS DETAILS
ME - 37	MONITORING EQUIPMENT
ME - 38	ADMINISTRATION BUILDING - STORE HOUSE AND WORKSHOP
ME - 39	ROADS AND DRAINAGE

ELECTRIC DRAWINGS

NE - 51 POWER PLANT AND SWITCHGEAR - GENERAL ONE LINE DIAGRAM
NE - 52 POWER PLANT ONE LINE DIAGRAM
NE - 53 132 kV SWITCHGEAR ONE LINE DIAGRAM
NE - 54 EXTENSION OF EXISTING 132 kV SWITCHGEAR ONE LINE DIAGRAM
NE - 55 AC LOW VOLTAGE DISTRIBUTION SYSTEM SHEET 1/2
NE - 56 AC LOW VOLTAGE DISTRIBUTION SYSTEM SHEET 2/2
NE - 57 GENERAL AUXILARIES SHEET 1/2 AND SHEET 2/2
NE - 58 UNIT AUXILARIES
NE - 59 LOCK AUXILARIES
NE - 60 DEWATERING LOCAL BOARD
NE - 61 VENTILATION No. 1 LOCAL BOARD
NE - 62 VENTILATION No. 2 LOCAL BOARD
NE - 63 POWER PLANT AND LOCK DC DISTRIBUTION SYSTEM
NE - 64 NEW ESNA SWITCHGEAR DC DISTRIBUTION SYSTEM
NE - 65 POWER PLANT CONTROL SYSTEM
NE - 66 CONTROL ROOM PERSPECTIVE
NE - 67 CONTROL ROOM TOP VIEW
NE - 68 LIGHTING AND SOCKET OUTLET SYSTEM
NE - 69 OUTSIDE LIGHTING
NE - 70 TELEPHONE NETWORK

MISCELLANEOUS EQUIPMENT

NE - 81 LOW PRESSURE COMPRESSED AIR DISTRIBUTION SYSTEM
NE - 82 FILTERED WATER SYSTEM
NE - 83 DEWATERING AND DRAINAGE SYSTEM
NE - 84 VENTILATION AND AIR CONDITIONING
NE - 85 MAINTENANCE EQUIPMENT - LUBRICATING OIL TREATMENT

DRAWINGS

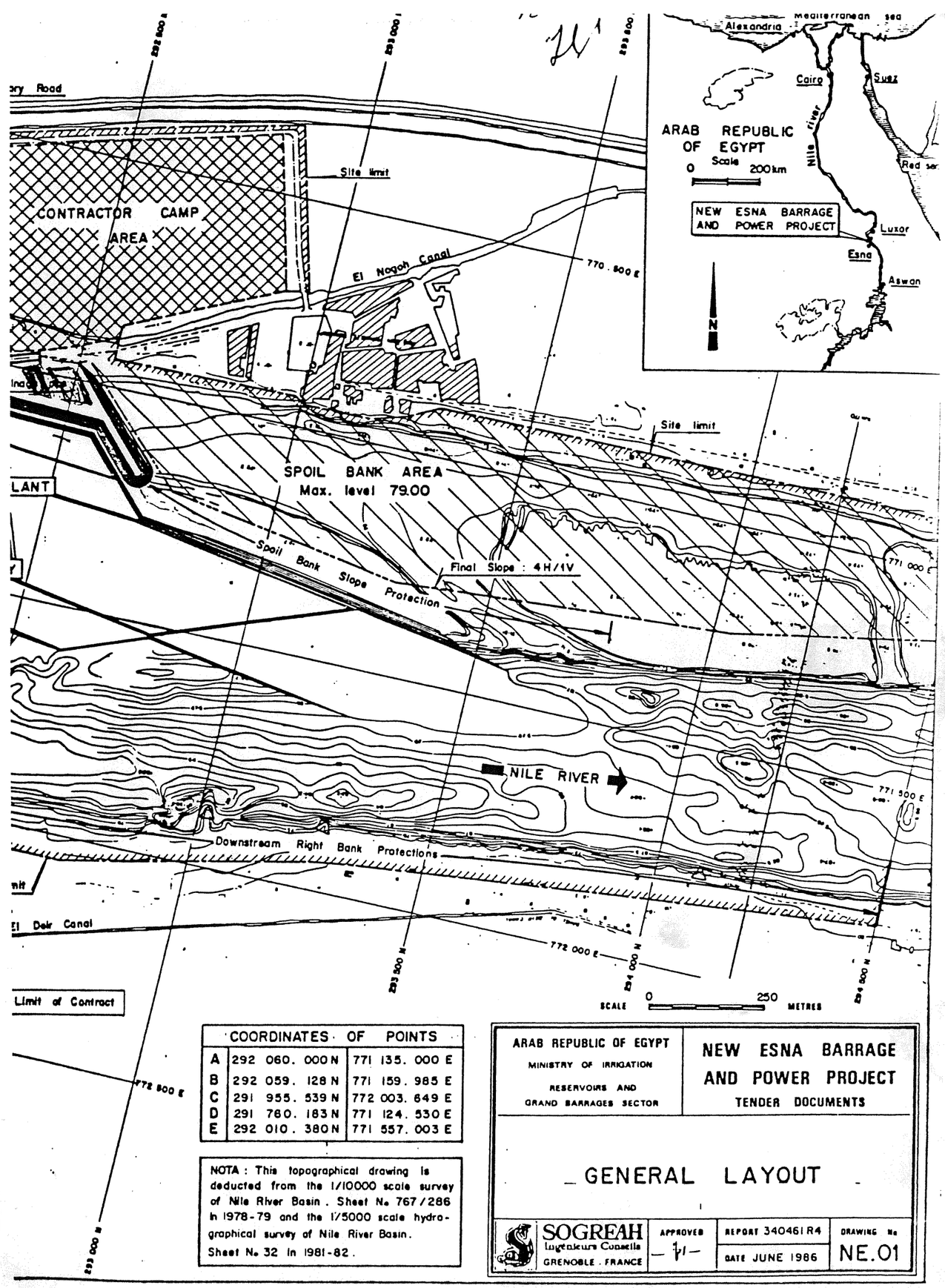
The following drawings number do not exist in this book :

From NE 40 to NE 50 and from NE 71 to NE 80

LIST OF DRAWINGS

CIVIL WORKS DRAWINGS

NE - 01	GENERAL LAYOUT
NE - 02	GENERAL ARRANGEMENT
NE - 03	STRUCTURES - GENERAL PLAN VIEW
NE - 04	EXCAVATION FOR STRUCTURES - No. 1
NE - 05	EXCAVATION FOR STRUCTURES - No. 2
NE - 06	COFFERDAM
NE - 07	FOUNDATION TREATMENT
NE - 08	NAVIGATION LOCK - PLAN VIEW
NE - 09	NAVIGATION LOCK - LONGITUDINAL AND CROSS-SECTIONS
NE - 10	NAVIGATION LOCK - CROSS-SECTIONS
NE - 11	NAVIGATION LOCK - AQUEDUCTS
NE - 12	NAVIGATION LOCK - UPSTREAM WAITING AREA
NE - 13	NAVIGATION LOCK - DOWNSTREAM WAITING AREA
NE - 14	NAVIGATION LOCK - MISCELLANEOUS DETAILS
NE - 15	NAVIGATION LOCK - CONTROL TOWER
NE - 16	POWER PLANT - PLAN VIEW
NE - 17	POWER PLANT - CROSS-SECTIONS
NE - 18	POWER PLANT - PLANS AT El. 56.50 AND 63.50
NE - 19	POWER PLANT - PLAN AT El. 71.00
NE - 20	POWER PLANT - PANS AT El. 73.50 AND 78.00
NE - 21	POWER PLANT - LONGITUDINAL SECTIONS
NE - 22	SPILLWAY - PARTIAL PLAN VIEW
NE - 23	SPILLWAY - SECTIONS AND DETAILS
NE - 24	CONNECTING STRUCTURE BETWEEN LOCK AND POWER PLANT
NE - 25	CONNECTING STRUCTURE BETWEEN POWER PLANT AND SPILLWAY No. 1
NE - 26	CONNECTING STRUCTURE BETWEEN POWER PLANT AND SPILLWAY No. 2
NE - 27	CONNECTING STRUCTURE BETWEEN SPILLWAY AND CLOSURE DAM No. 1
NE - 28	CONNECTING STRUCTURE BETWEEN SPILLWAY AND CLOSURE DAM No. 2
NE - 29	CLOSURE DAM
NE - 30	FINAL CUT-OFF
NE - 31	RIP RAP PROTECTIONS - PLAN VIEW
NE - 32	RIP RAP PROTECTIONS - SECTIONS
NE - 33	METALLIC EQUIPEMENT - RAILINGS
NE - 34	METALLIC EQUIPMENT - LADDERS
NE - 35	METALLIC EQUIPEMENT - STAIRS
NE - 36	MISCELLANEOUS DETAILS
NE - 37	MONITORING EQUIPMENT
NE - 38	ADMINISTRATION BUILDING - STORE HOUSE AND WORKSHOP
NE - 39	ROADS AND DRAINAGE



COORDINATES OF POINTS		
A	292 060. 000 N	771 135. 000 E
B	292 059. 128 N	771 159. 985 E
C	291 955. 539 N	772 003. 649 E
D	291 760. 183 N	771 124. 530 E
E	292 010. 380 N	771 557. 003 E

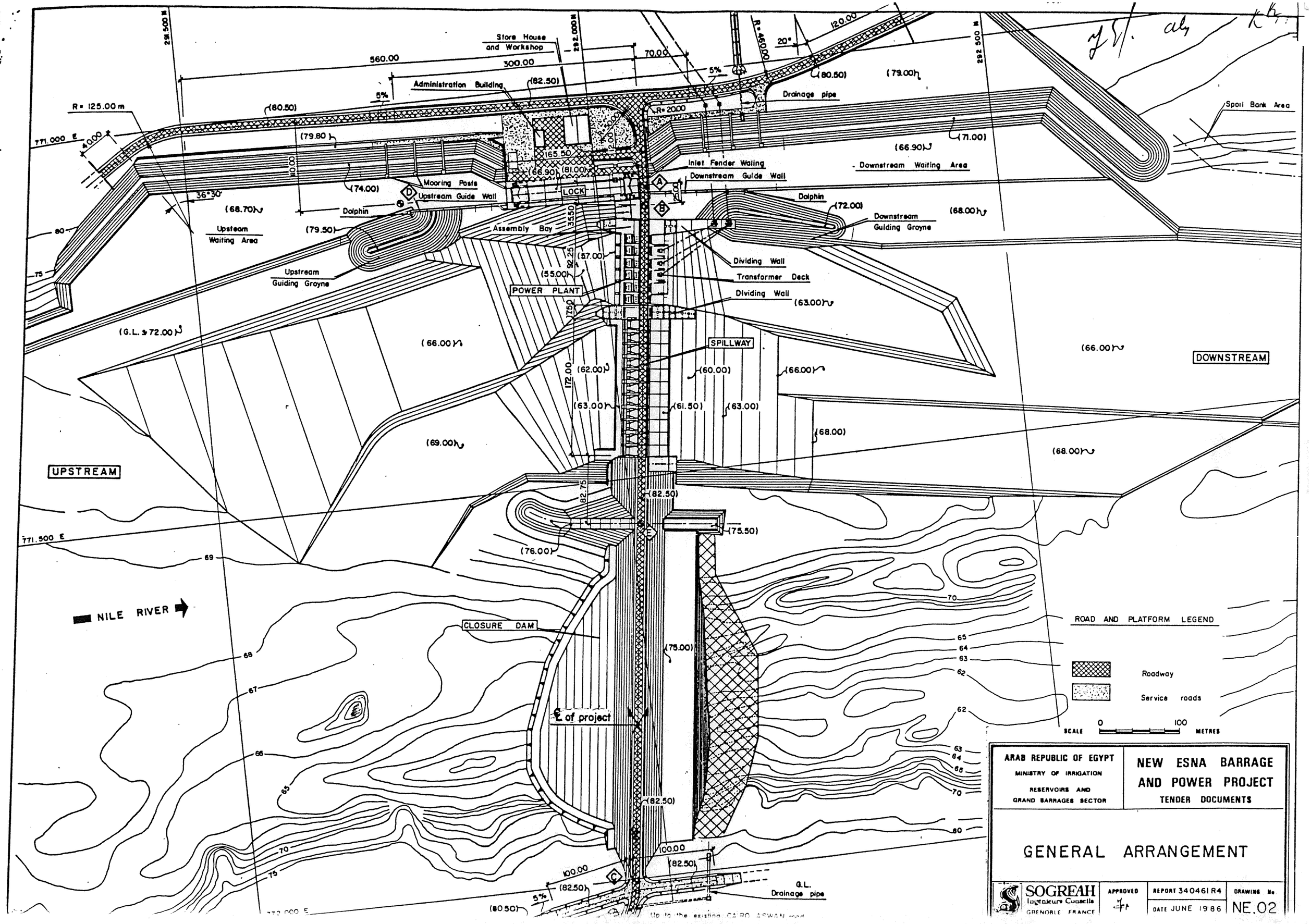
NOTA : This topographical drawing is deducted from the 1/10000 scale survey of Nile River Basin. Sheet No. 767/286 in 1978-79 and the 1/5000 scale hydrographical survey of Nile River Basin. Sheet No. 32 in 1981-82.

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

GENERAL LAYOUT

SOGREAH Ingénieurs Conseils GRENOBLE . FRANCE | APPROVED | REPORT 340461 R4 | DATE JUNE 1986 | DRAWING No NE.01



ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

GENERAL ARRANGEMENT

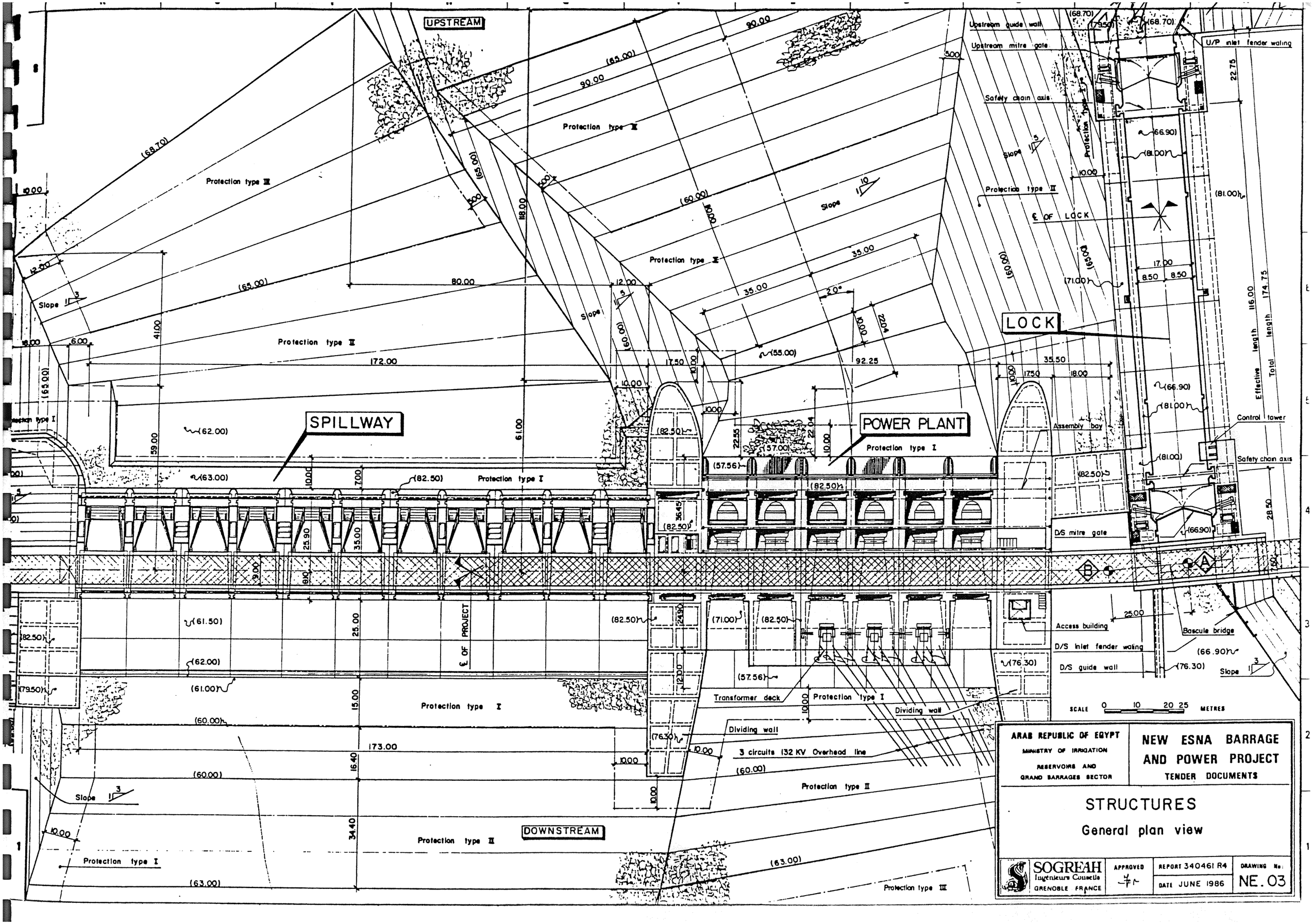
SOGREAH Ingenieure Conseils GRENOBLE FRANCE

APPROVED

REPORT 340461R4

DATE JUNE 1986

DRAWING No NE.02



ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND
GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

STRUCTURES

General plan view

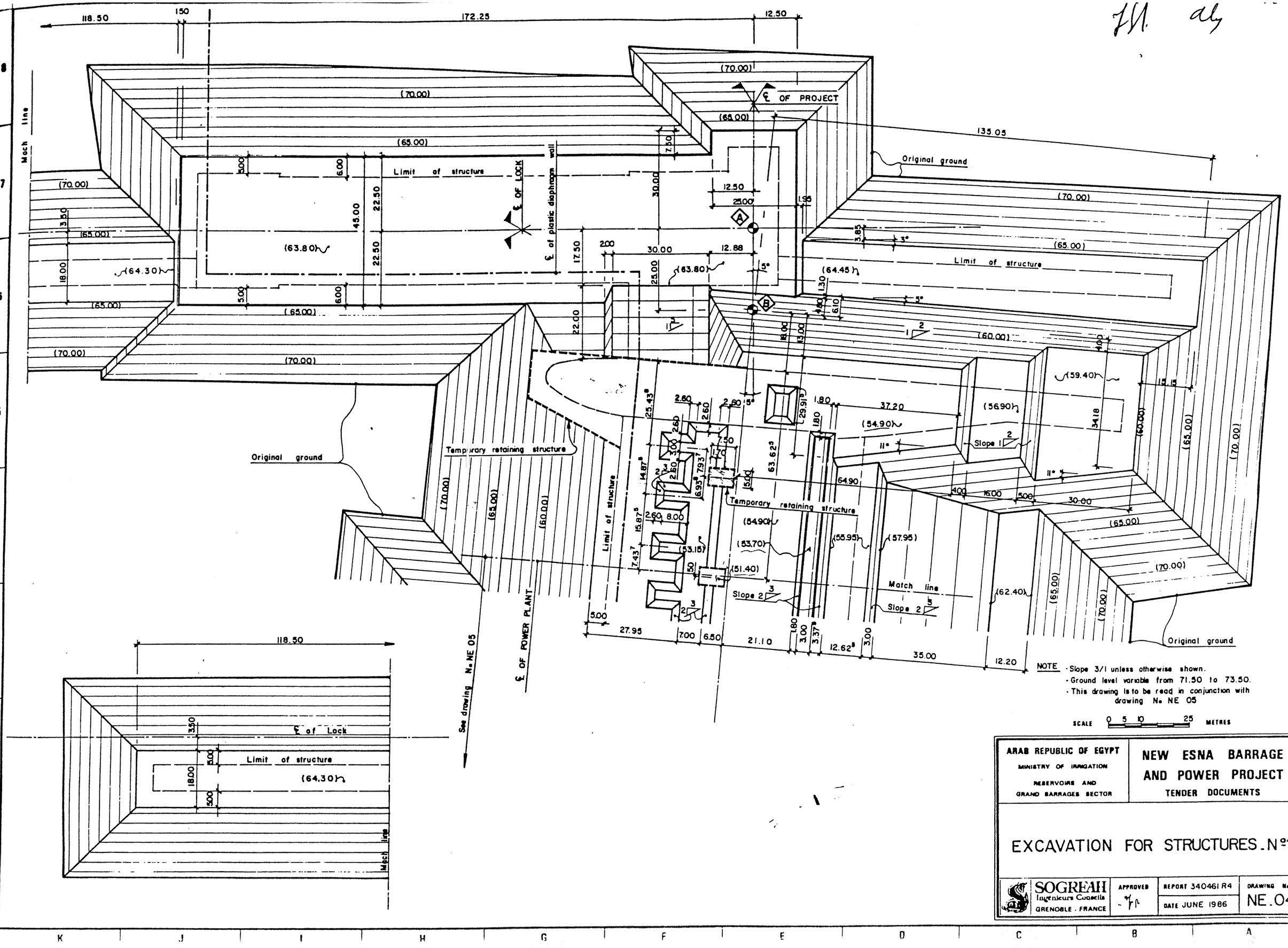
SOGREAH Ingénieurs Conseils GRENOBLE FRANCE

APPROVED

REPORT 340461 R4

DATE JUNE 1986

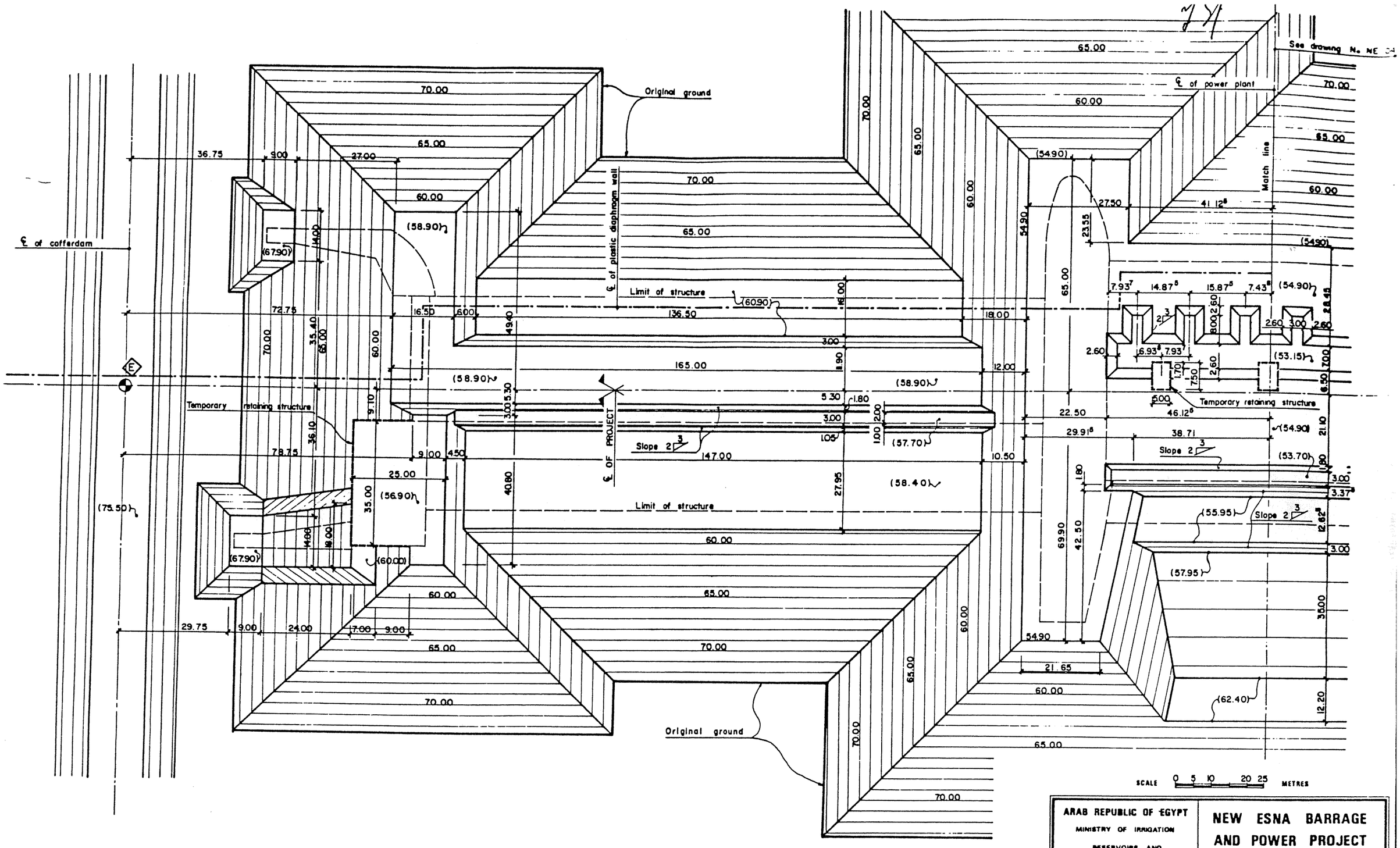
DRAWING No.: NE.03



NOTE
- Slope 3/1 unless otherwise shown.
- Ground level variable from 71.50 to 73.50.
- This drawing is to be read in conjunction with drawing No. NE 05

SCALE 0 5 10 25 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS
EXCAVATION FOR STRUCTURES. N°1	
SOGREAH Ingénieurs Conseils GRENOBLE - FRANCE	APPROVED REPORT 340461 R4 DATE JUNE 1986 DRAWING No. NE.04



NOTE :

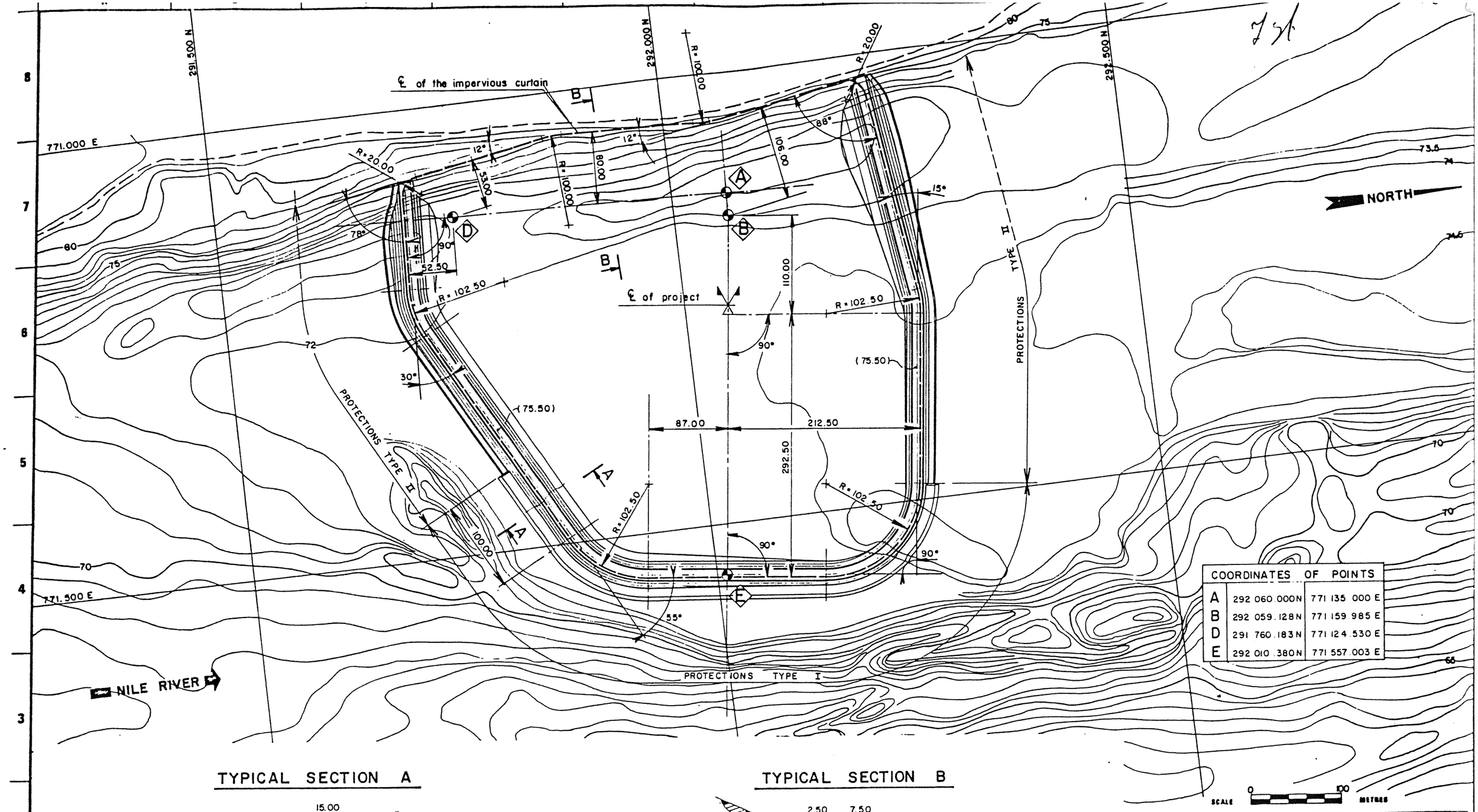
- Slope 3/1 unless otherwise shown.
- Ground level variable from 72.50 to 73.50
- This drawing is to be read in conjunction with drawing No. NE 04

SCALE 0 5 10 20 25 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

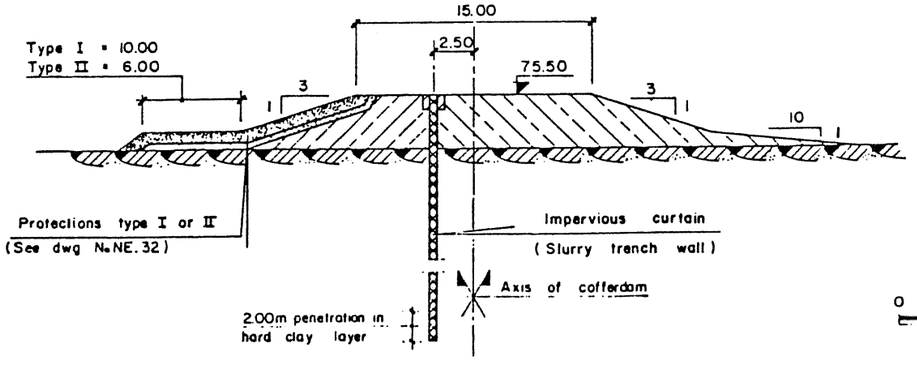
EXCAVATION FOR STRUCTURES. N°2

SOGREAH Ingenieurs Conseils GRENOBLE - FRANCE	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DRAWING No. NE.05

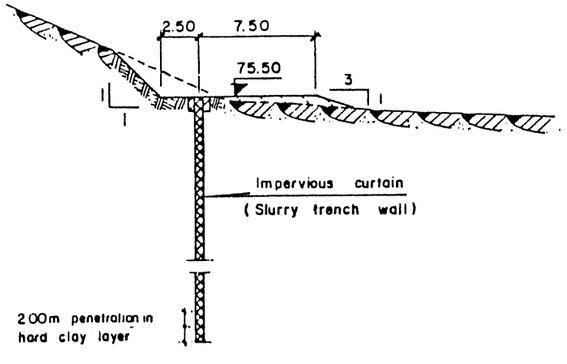


COORDINATES OF POINTS		
A	292 060.000N	771 135.000 E
B	292 059.128N	771 159.985 E
D	291 760.183N	771 124.530 E
E	292 010.380N	771 557.003 E

TYPICAL SECTION A



TYPICAL SECTION B



0 2 4 6 8 10m

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND
GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

COFFERDAM

SOGREAH Ingénieurs Conseils GRENOBLE - FRANCE

APPROVED

REPORT 34046i R4

DATE JUNE 1986

DRAWING No. NE.06

19

Upstream wing wall (see dwg No.NE 12)

Slope 1/3

Lock total length 174.75

Lock effective length 116.00

Mach line

22.75

25.00

3.50x2.00 Opening with reinforced concrete cover

2.25

20.00 20.00 20.00

16.00

2.00 2.00

(Backfill not shown)

Upstream inlet fender waling (see dwg No.NE 14)

US Stoplog groove

Differential water level indicator pit

UPSTREAM

Upstream mitre gate

Metallic ladder

80x80 access pit to the aqueduct.

Safety chain axis

Upstream guide wall (see dwg No.NE 12)

Metallic stairs and railing

3 PVC pipes ϕ 300mm

Fixed bollard

Fixed bollards

Upstream aqueduct (see dwg No.NE 11)

80x80 access manhole to the gate chamber

Transition slab 9.00 x 5.00 thickness 30 cm

To new switchyard and various buildings

Control tower structure (see dwg No.NE 15)

80x80 access manhole

2.80x2.00 Opening with reinforced concrete cover

To U/S structure

Carriage way

Downstream inlet fender waling (see dwg No.NE 14)

Fixed bollards 10 Nos

Metallic ladder 4 Nos

Differential water level indicator pits (2 Nos)

Downstream mitre gate

Downstream stoplog groove

BASCULE BRIDGE

Heavy duty railing

DOWNSTREAM

Safety chain axis

3 x 3 PVC pipes ϕ 300mm

Metallic stairs and railing (see dwg No.NE 35)

℄ OF PROJECT

℄ OF LOCK

5.00 x 2.00 Opening with reinforced concrete cover

Downstream aqueduct (see dwg No.NE 11)

Electric cables from power plant

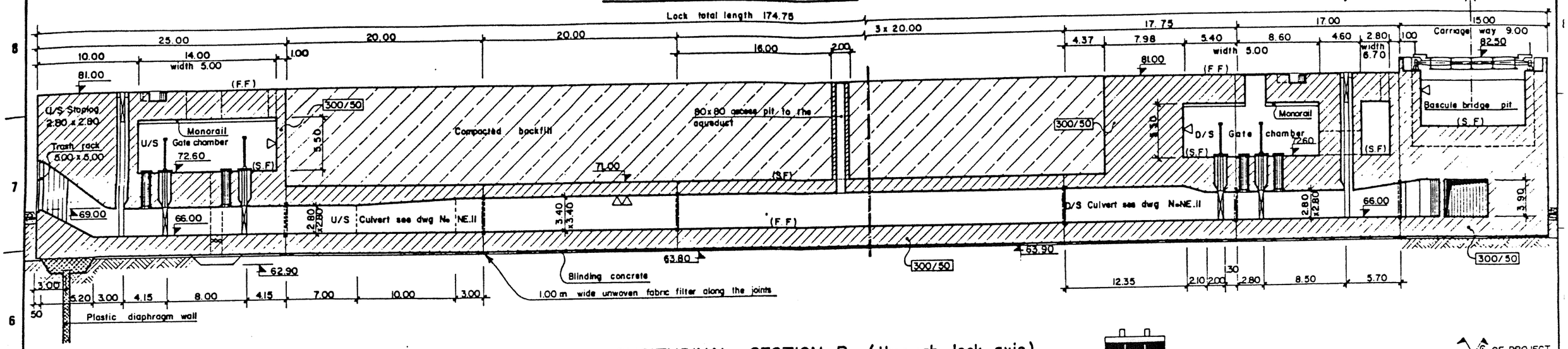
Downstream guide wall (see dwg No.NE 13)

(See dwg No. NE 24)

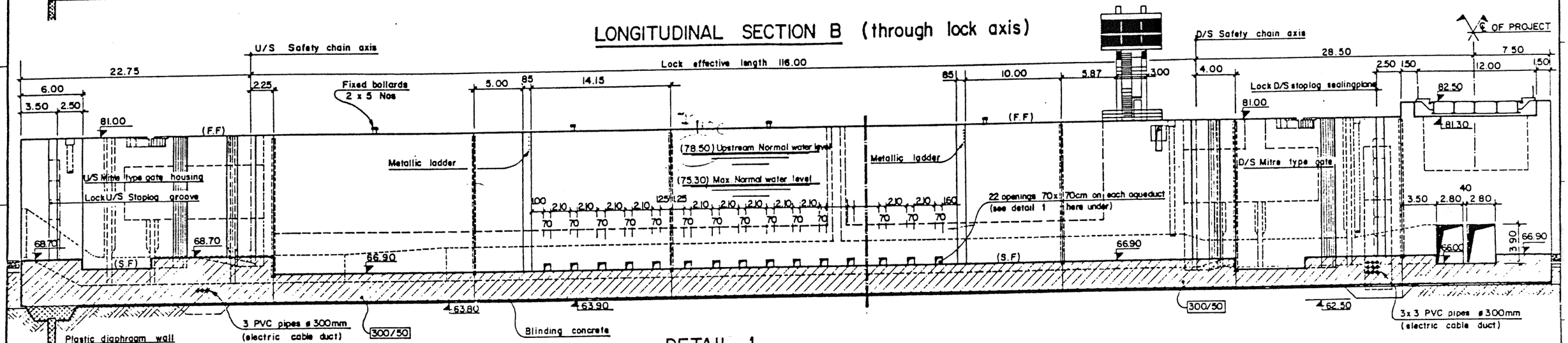
SCALE 0 2 4 8 10 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS		
NAVIGATION LOCK Plan view			
SOGREAH Ingenieurs Conseils GRENOBLE FRANCE	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DRAWING No. NE.08

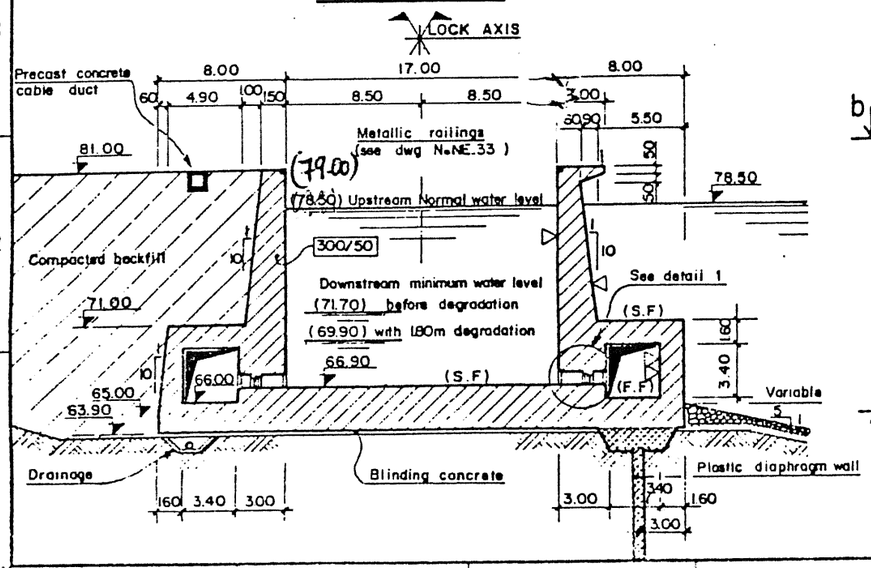
LONGITUDINAL SECTION A (through left bank aqueduct)



LONGITUDINAL SECTION B (through lock axis)

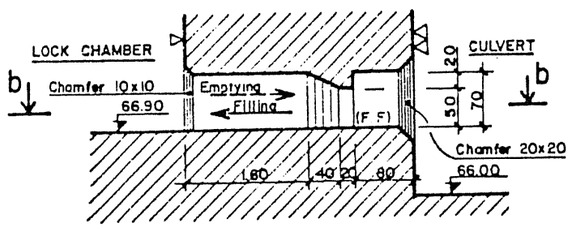


SECTION C

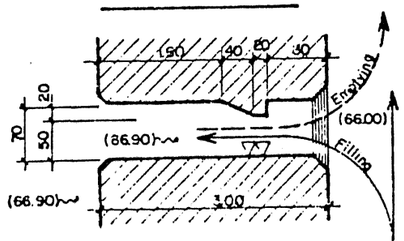


DETAIL 1

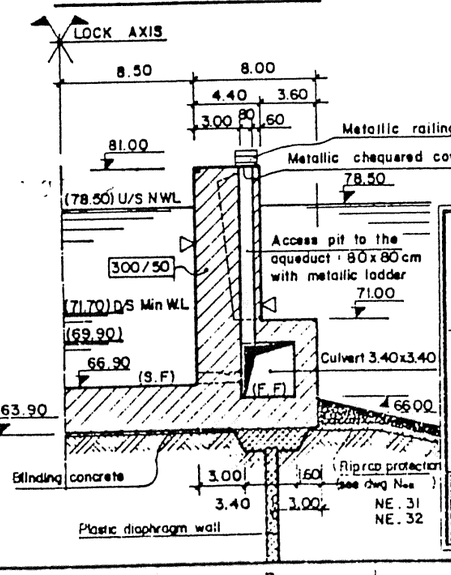
Section a



Plan section b



HALF SECTION D



SCALE 0 2 4 8 10 METRES

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

NAVIGATION LOCK

Longitudinal and Cross-sections

SOGREAH Ingenieurs Conseils GRENOBLE FRANCE

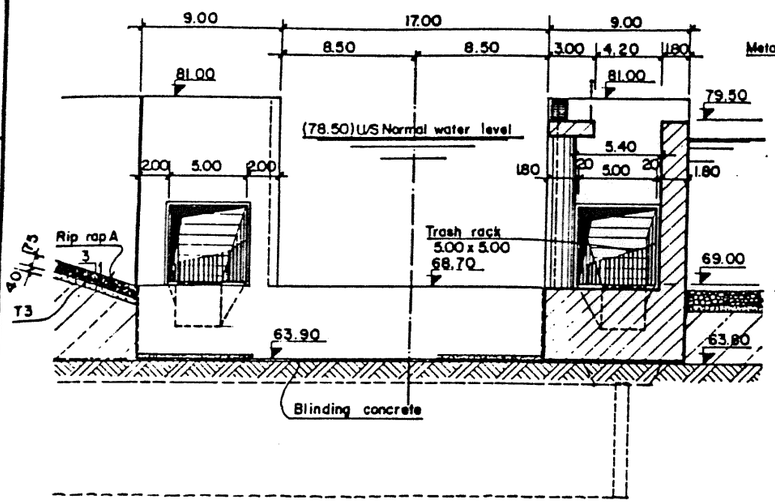
APPROVED

REPORT 340461 R4

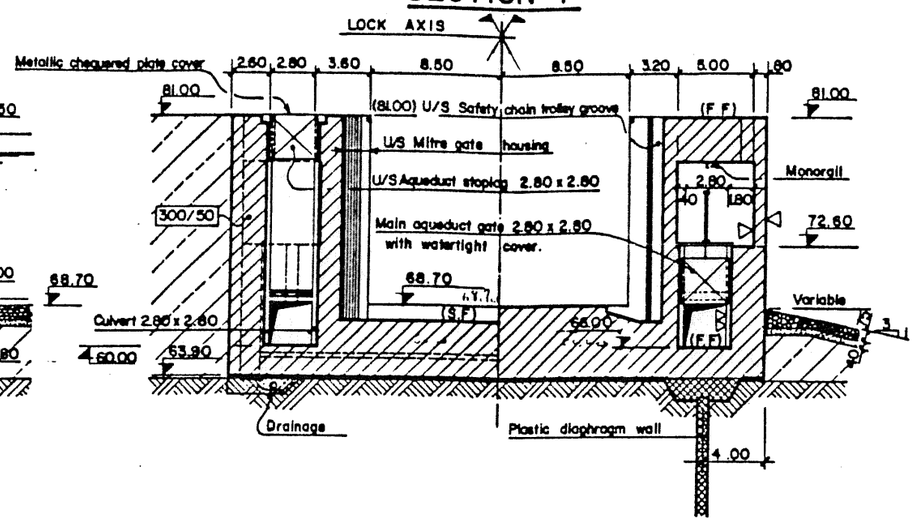
DATE JUNE 1986

DRAWING No NE.09

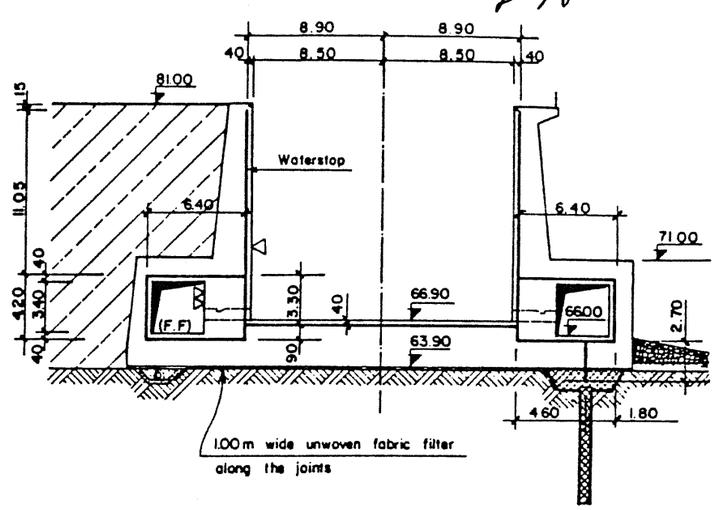
SECTION E



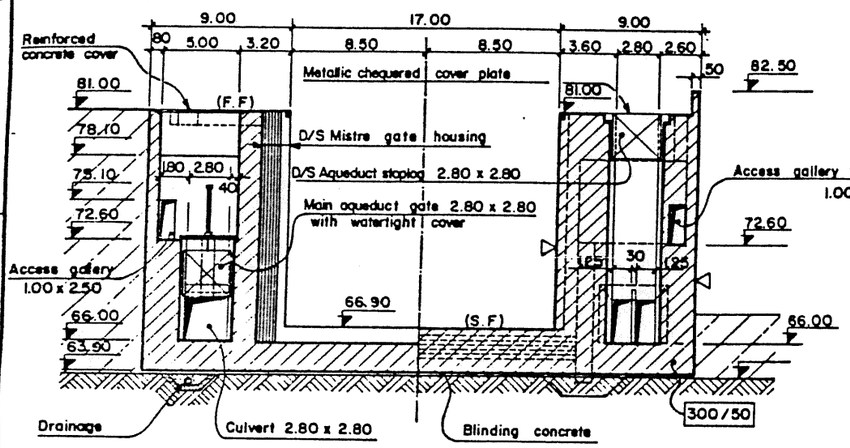
SECTION F



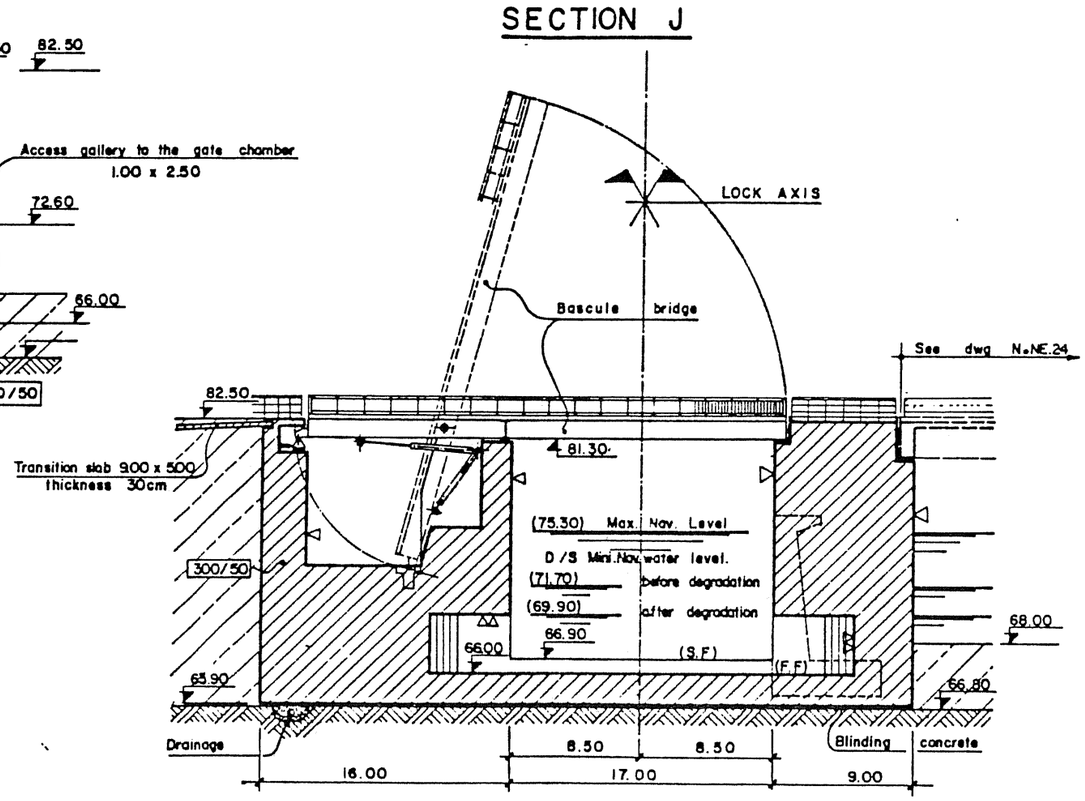
SECTION G



SECTION H



SECTION J



SCALE 0 2 4 3 8 10 METRES

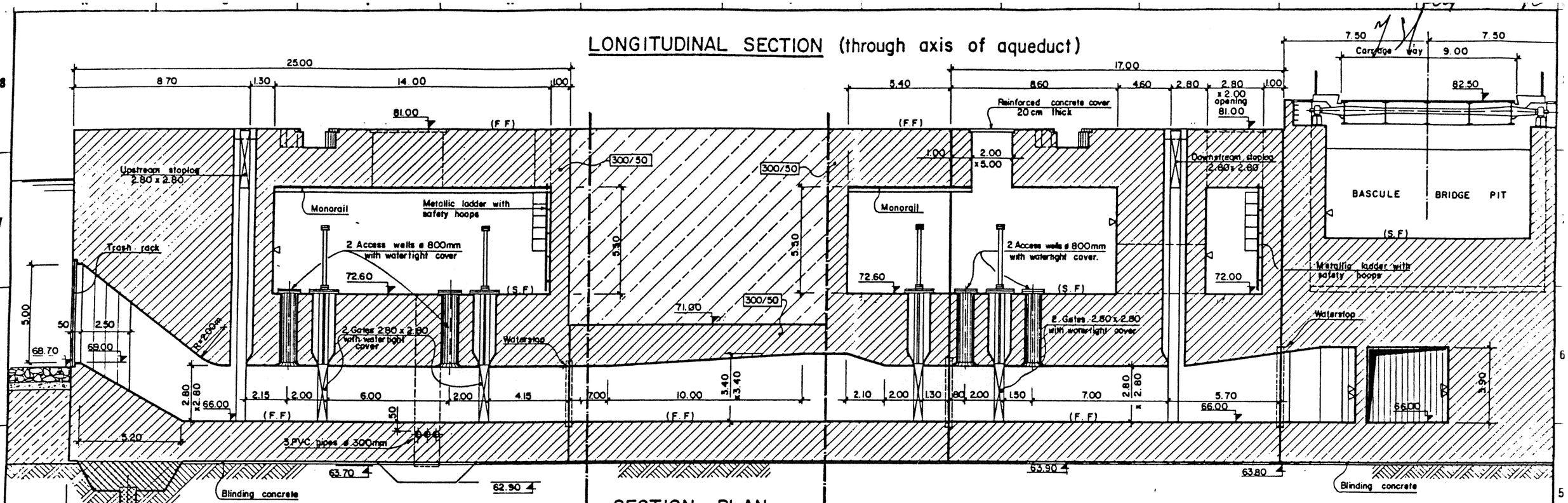
ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

NAVIGATION LOCK

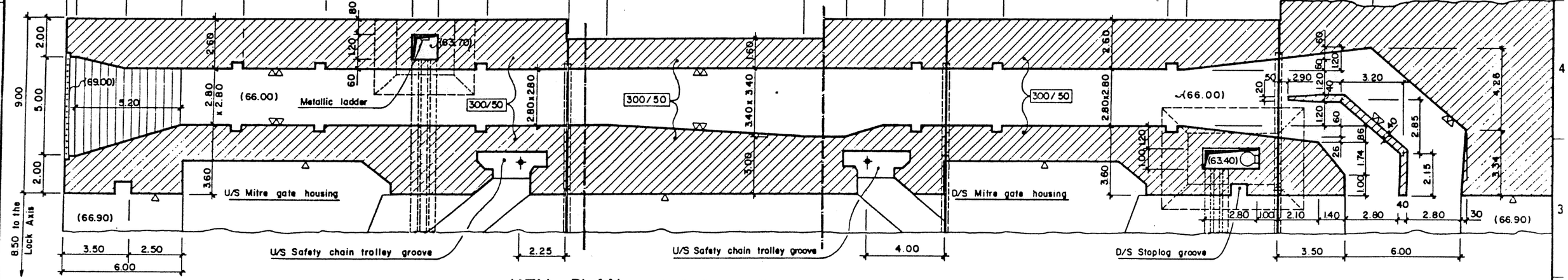
Cross - sections

SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED	REPORT 340461 R4	DRAWING No NE.10
		DATE JUNE 1986	

LONGITUDINAL SECTION (through axis of aqueduct)

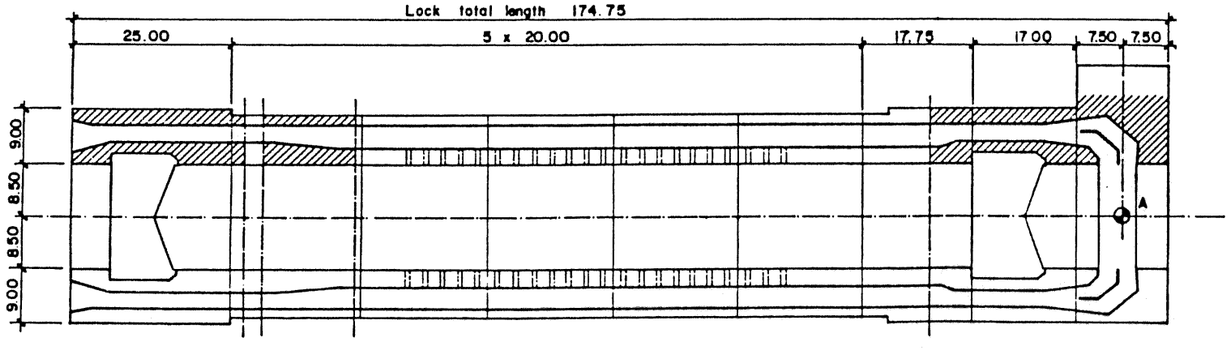


SECTION PLAN



KEY PLAN

SCALE 0 5 10 25 METRES

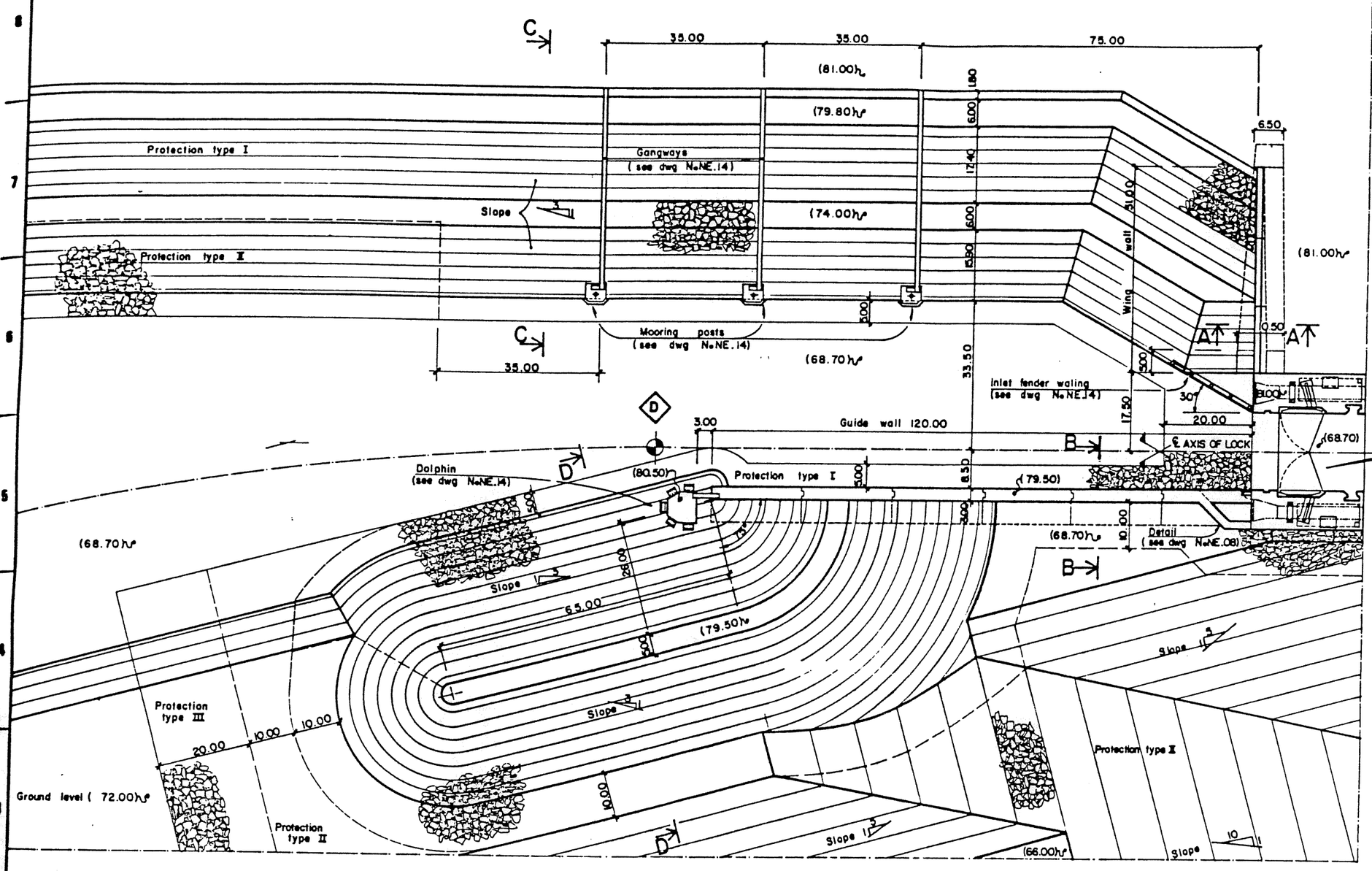


SCALE 0 1 2 3 4 5 METRES

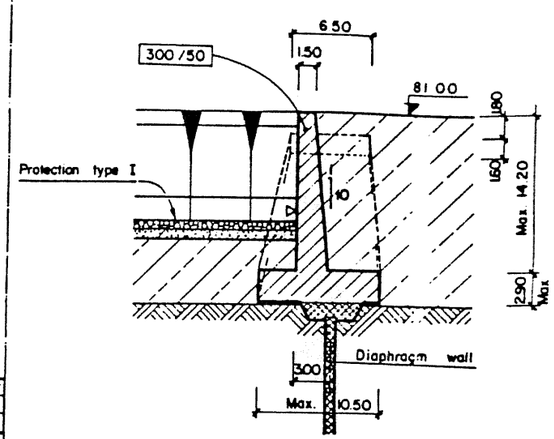
ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS
NAVIGATION LOCK Aqueducts	
SOGREAH Ingenieurs Conseils GRENOBLE FRANCE	APPROVED REPORT 340461 R4 DATE JUNE 1986 DRAWING No NE. 11

PLAN VIEW

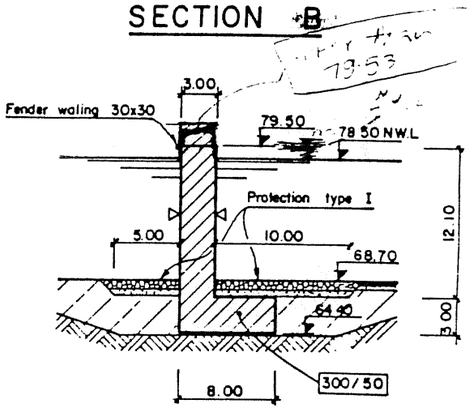
0 5 10 15 20 25 METRES



SECTION A

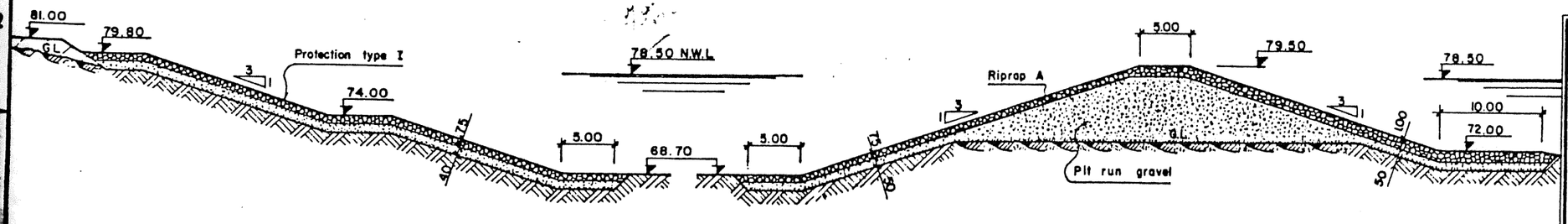


SECTION B



NOTE : DETAILS OF PROTECTIONS TYPE (See dwg N. NE.32)

SECTION C



SECTION D

SCALE 0 5 10 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

NAVIGATION LOCK

Upstream waiting area

SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DRAWING No. NE.12

PLAN VIEW

0 5 10 15 20 25 METRES

LOCK

℄ AXIS OF LOCK

BASCULE BRIDGE

Bridge

Inlet fender walling (see dwg N.NE.14)

Wing wall 45.00

Guide wall 120.00

Dividing wall 90.00

Mooring posts (see dwg N.NE.14)

Gangways (see dwg N.NE.14)

Dolphin (see dwg N.NE.14)

Protection type I

Protection type II

Slopes 1:1

Slope 3:1

Slope 4:1

Slope 3:1

℄ OF PROJECT

POWER PLANT

(82.50) (81.00) (82.50) (76.30) (68.00) (82.50) (76.30) (75.00) (72.00) (63.00) (66.90) (66.90) (68.00) (71.00)

80.00 35.00 35.00 (79.00) 6.50 15.00 45.00 7.50 12.00 5.00 30° 42.00 13.50 8.50 3° 3.00 25.00 18.00 24.90 0° 10.00 10.00 5.00 3.00 40.00 120.00 20.00 10.00 20.00 10.00 24.00 6.00 12.50 33.50 35.00

SECTION A

℄ OF PROJECT 7.50 1.50 82.50 79.00 15.60 Max. 8.00 2.25 3.00 Min. 13 Protection type I 6.50 Max. 12.00 300/50

SECTION B

5 Fender walings 30x30 3.00 1.50 1.50 Max. N.L 75.30 Min. W.L 71.70 1.00 9.40 76.30 75.30 68.00 66.90 64.55 2.25 5.00 7.00 300/50 Protection type I

SECTION C

79.00 Protection type II 76.00 Protection type I 75.30 Max. Navig. level 71.70 71.00 5.00 66.90 GL 3 1 68.00 5.00 5.00 Variable Rip rap A 3 1 3 1 10.00 63.00 1.00 0.50 Pit run gravel

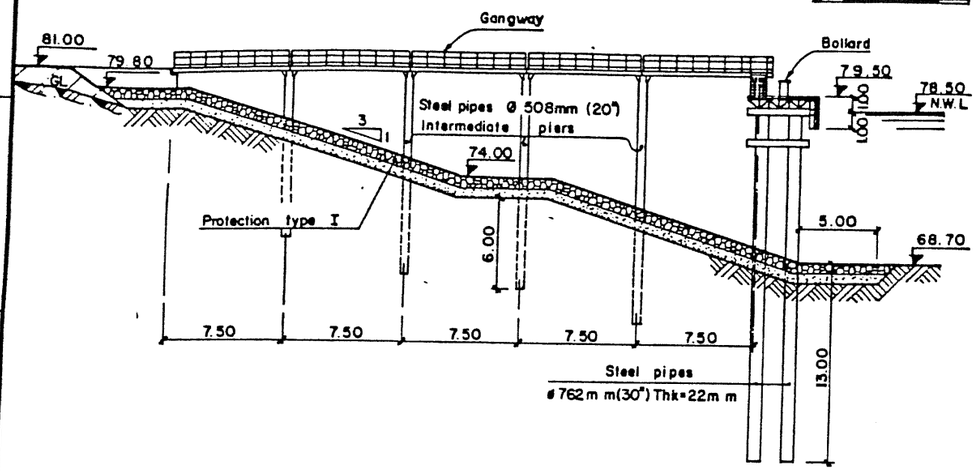
SECTION D

NOTE: DETAILS OF PROTECTION TYPE AND DRAINAGE PIPE OUTLET (See dwg N. NE.32)

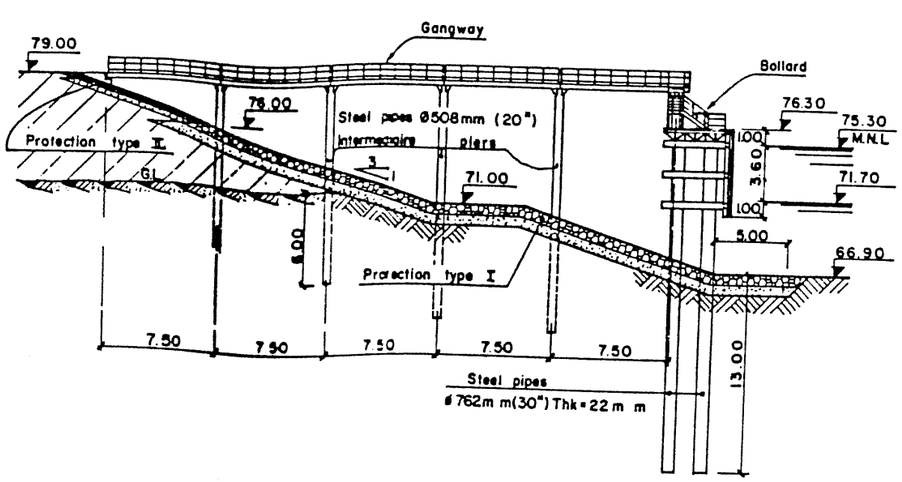
SCALE 0 5 10 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS	
NAVIGATION LOCK Downstream waiting area		
SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED	REPORT 34046IR4 DATE JUNE 1986 DRAWING No. NE.13

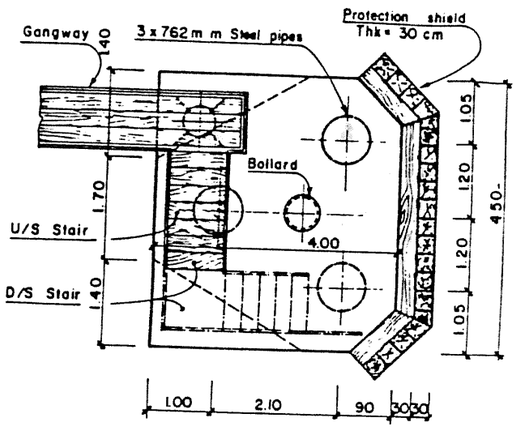
UPSTREAM MOORING POST



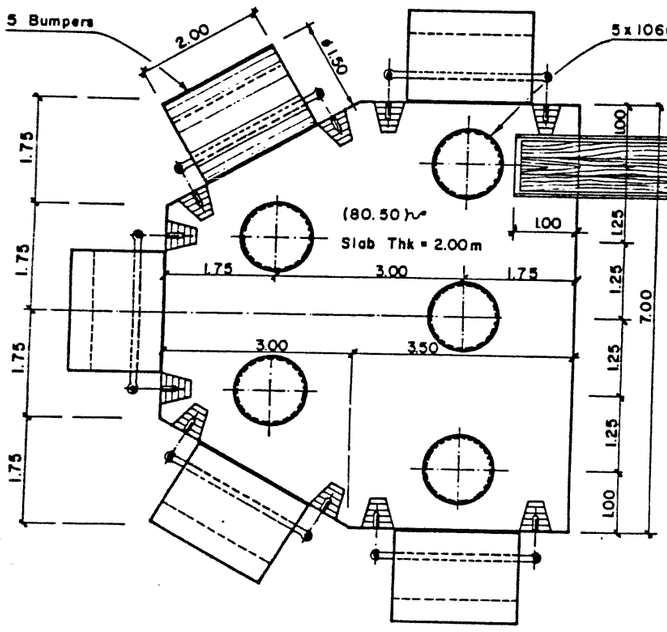
DOWNSTREAM MOORING POST



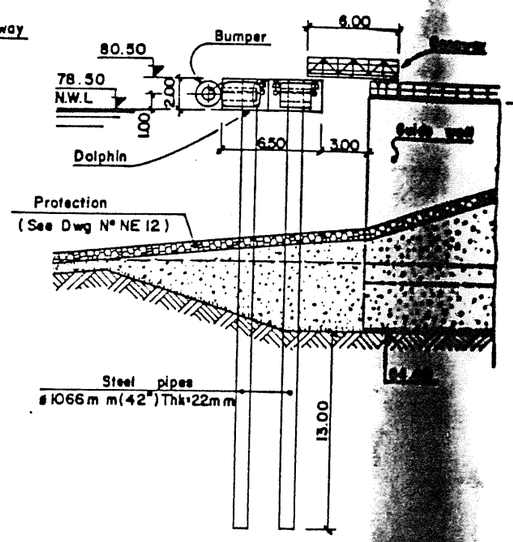
U-D/S MOORING POST PLAN VIEW



PLAN VIEW — UPSTREAM DOLPHIN



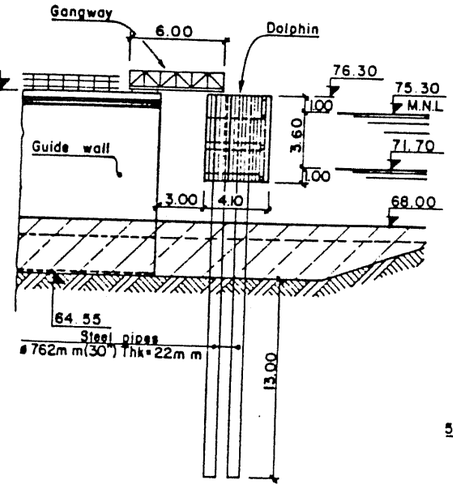
ELEVATION — UPSTREAM DOLPHIN



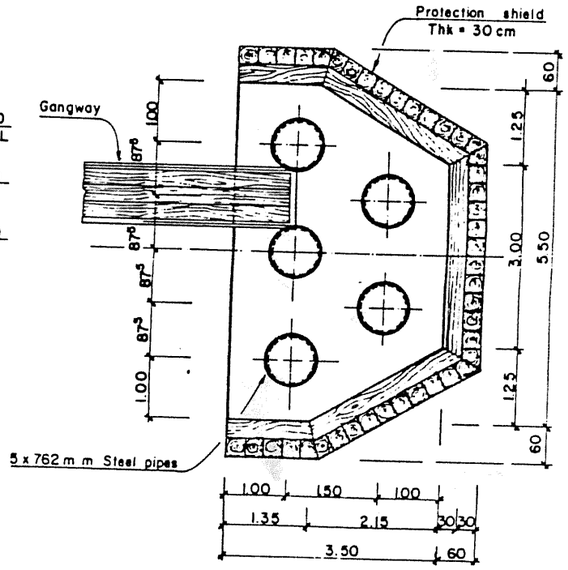
DOWNSTREAM DOLPHIN

0 10 METRES

ELEVATION

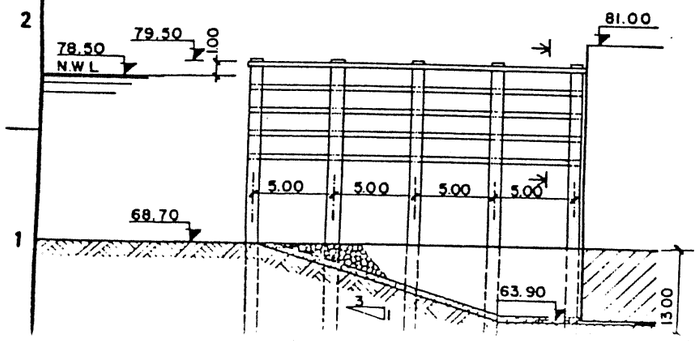


PLAN VIEW



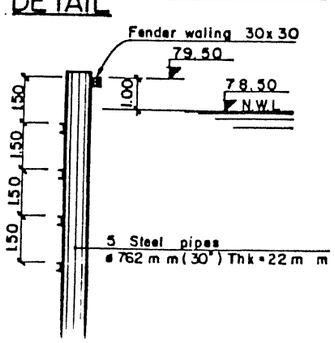
UPSTREAM INLET FENDER WALING

(VALID FOR FENDER WALING UPSTREAM EXISTING LOCK)

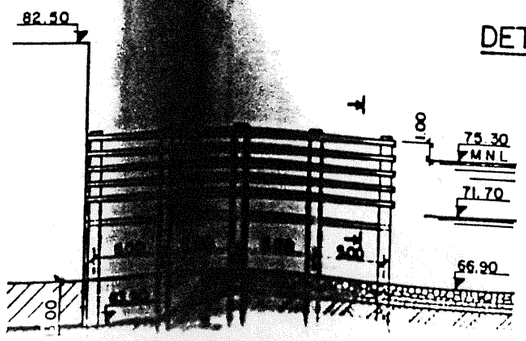


DETAIL

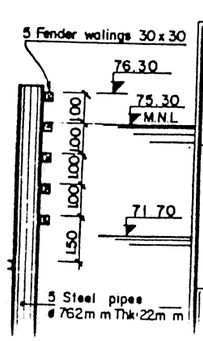
0 10 METRES



DOWNSTREAM INLET FENDER WALING



DETAIL



SCALE 0 2 METRES

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

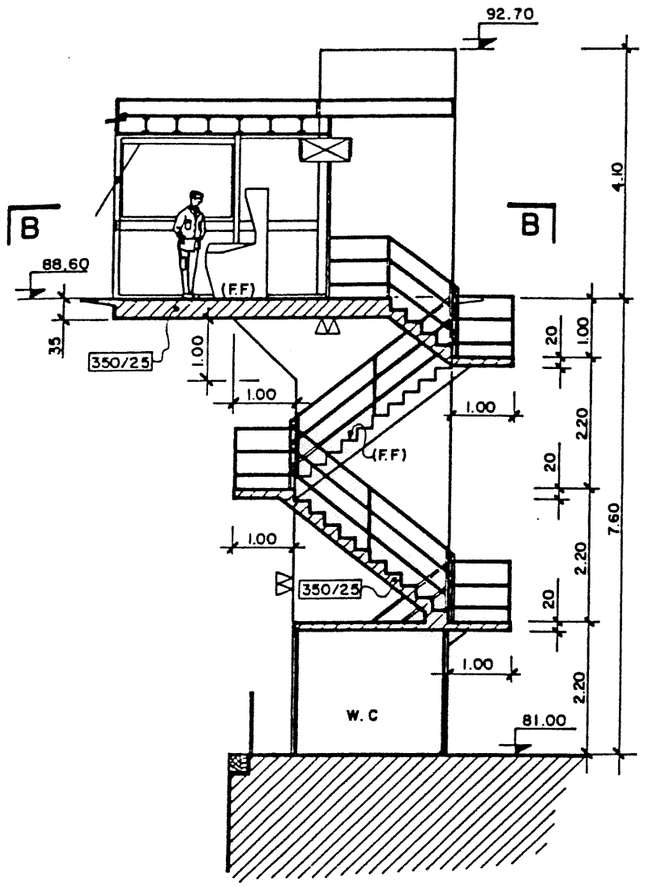
NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

NAVIGATION LOCK

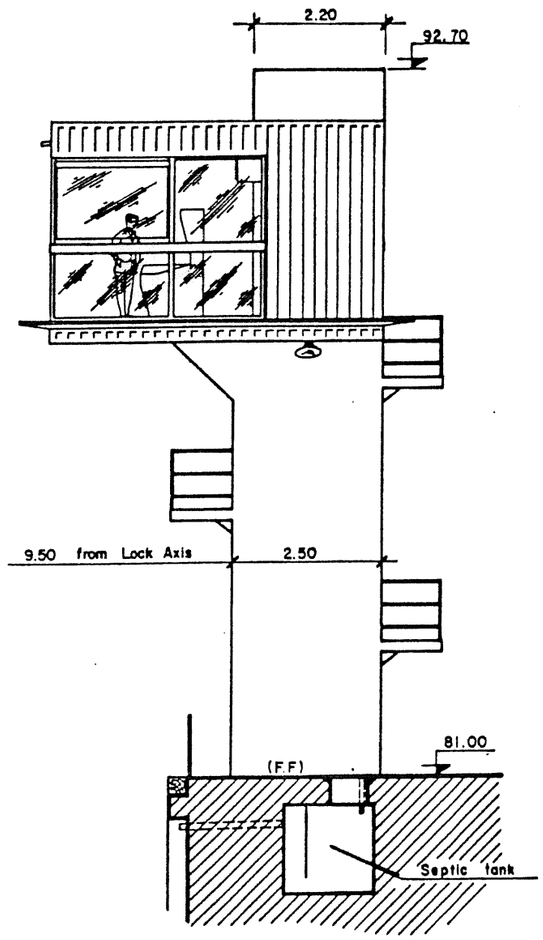
Miscellaneous details

SOGREAH | APPROVED | REPORT 340461 R4 | DRAWING No

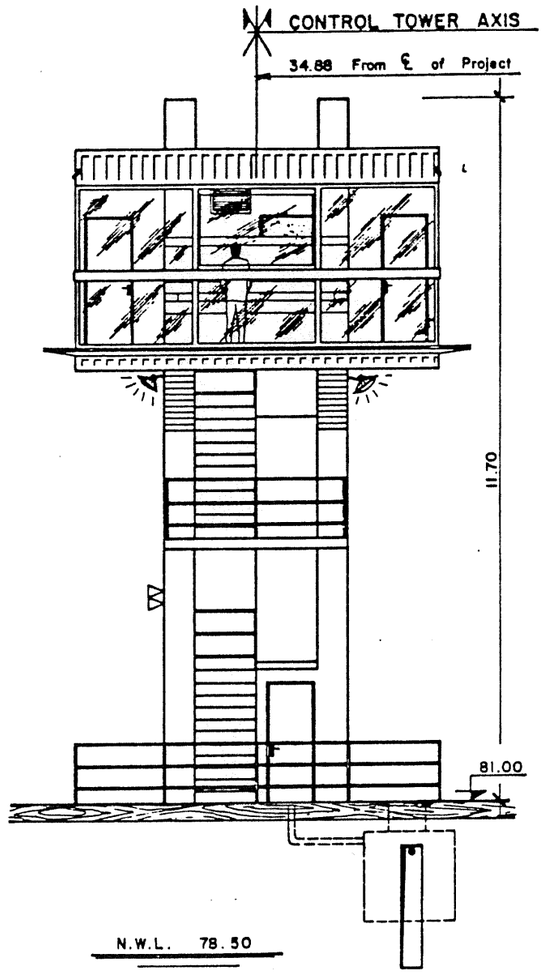
SECTION A



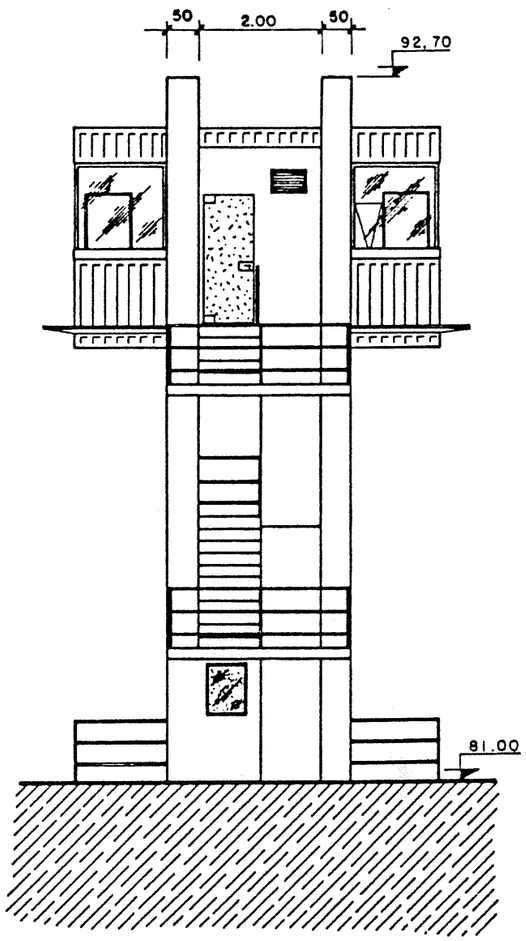
SIDE ELEVATION



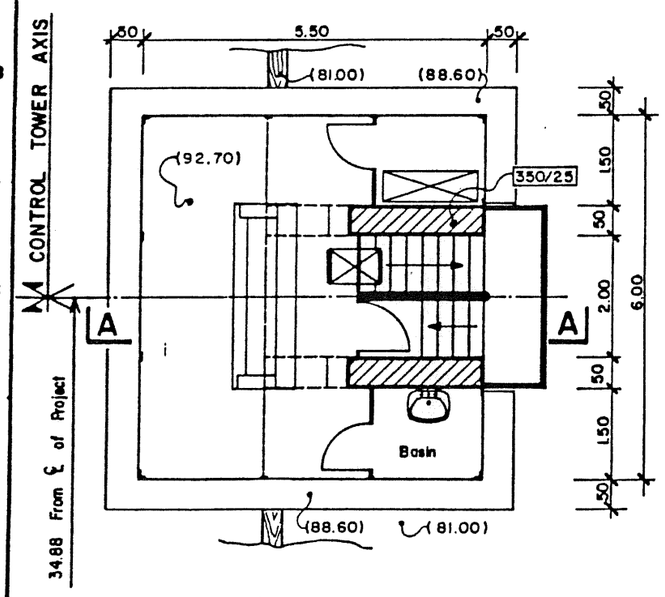
FRONT ELEVATION



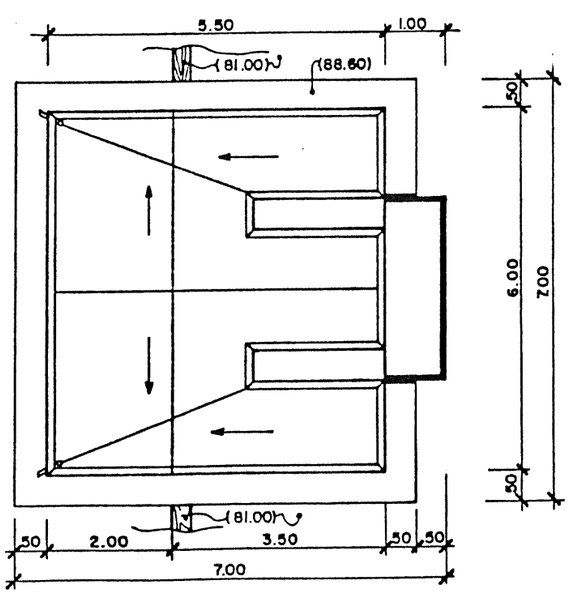
REAR ELEVATION



SECTION B



PLAN VIEW



Scale

0 1 2 3 m

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

NAVIGATION LOCK

Control tower

SOGREAH Engineers Consults GRENOBLE FRANCE	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DWG. No. NE. 15

UPSTREAM

DOWNSTREAM

A

B

C

D

E

F

Trash rack

Trash rack rake

Upstream stoplogs

Cable pits 85 x 100
reinf. concrete cover 95 x 110 x 10cm thick

Railing

Access to the transformer deck

Cable duct

Fuel tank cover

Downstream bulkhead

Main transformers 3 units

Access building

Overhead line
outgoing portal

Metallic fence

3 Circuits 132 KV Overhead line

Overhead travelling crane rail axis.

rails axis

Gantry crane

Carriage way

€ OF BULB UNIT RUNNER

€ OF PROJECT

25.00 to A

5°

18.00

17.50

(82.50)

(73.50)

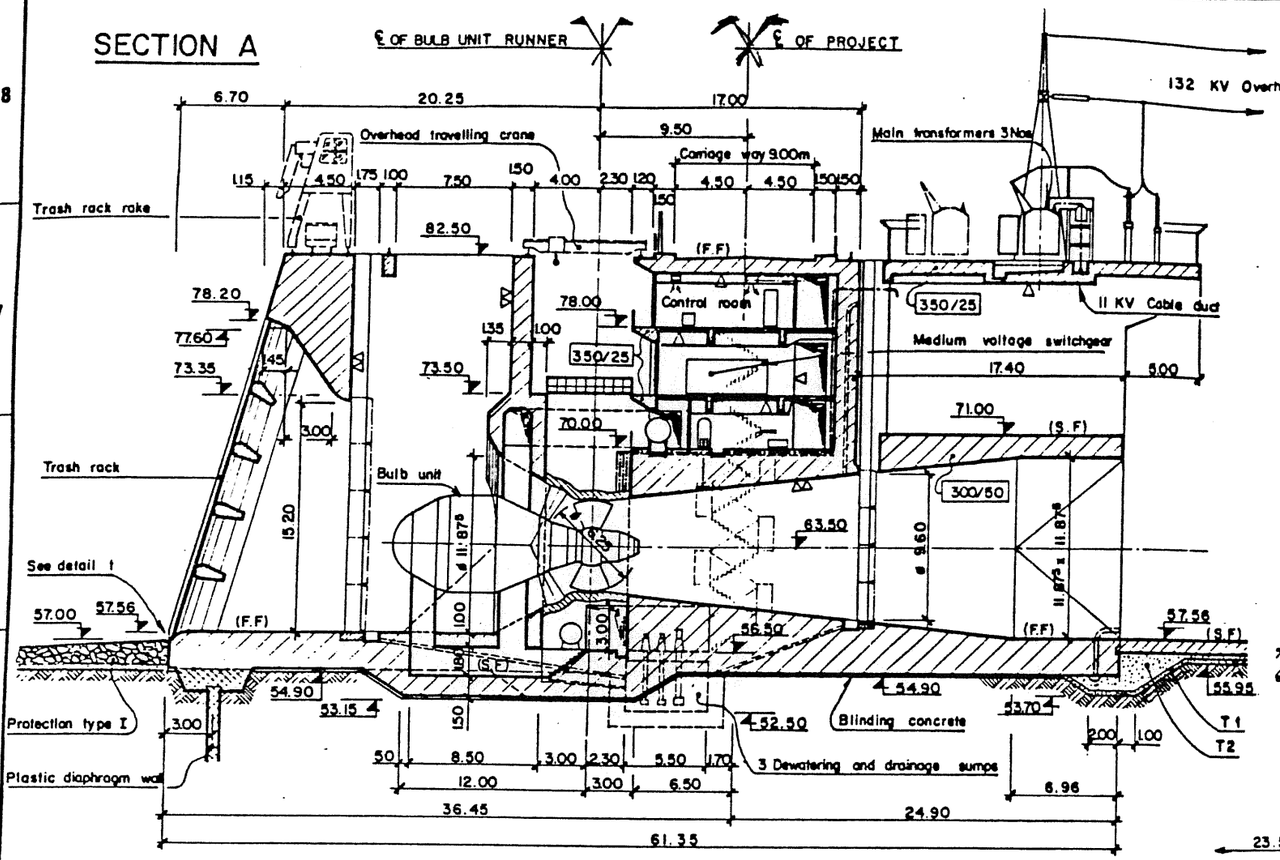
(71.00)

(57.56)

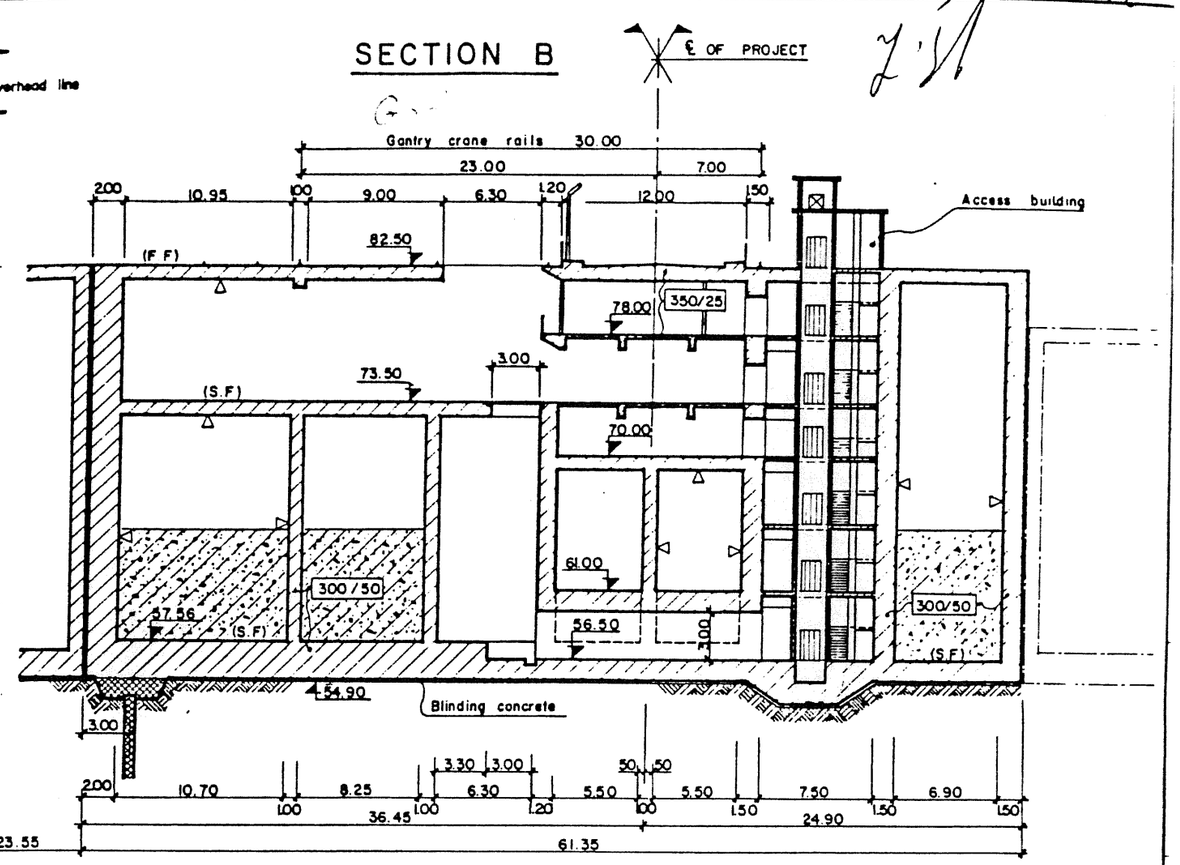
SCALE 0 2 4 6 8 10 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS
POWER PLANT Plan view	
SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED REPORT 340461 R4 DATE JUNE 1986 DRAWING No NE.16

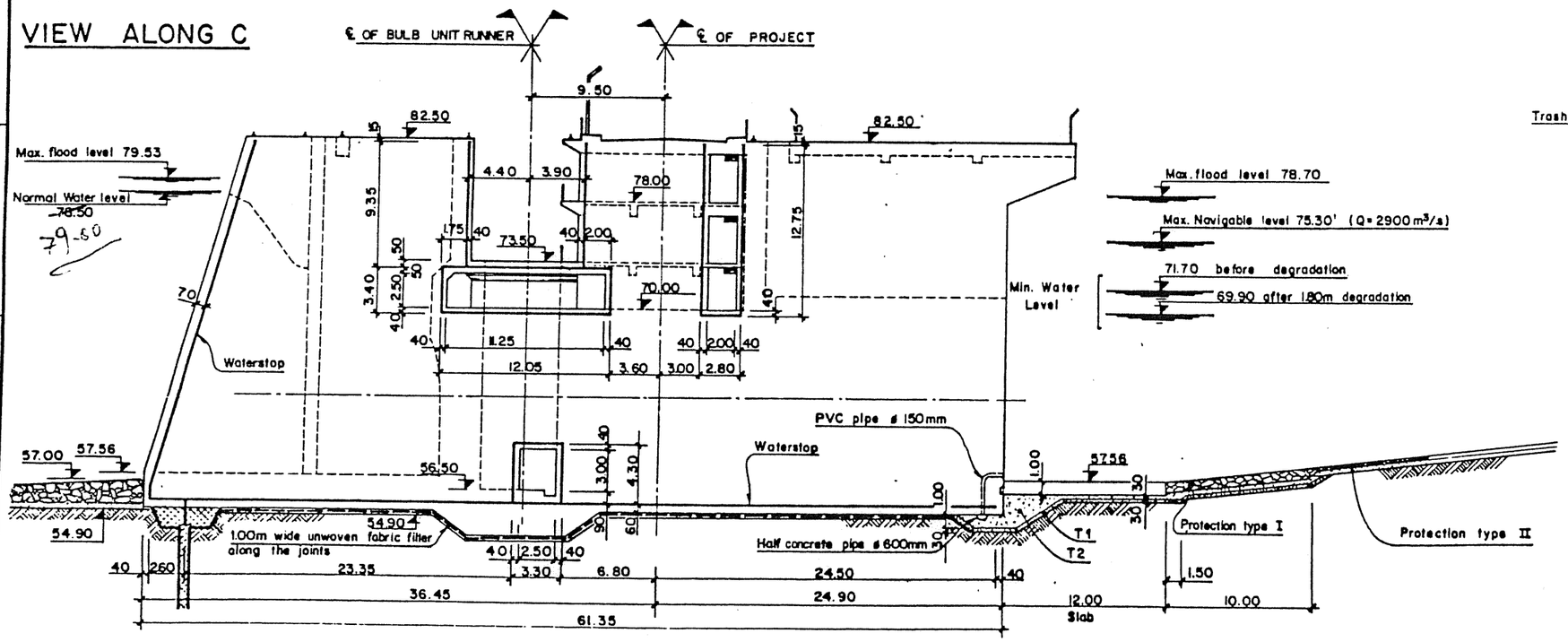
SECTION A



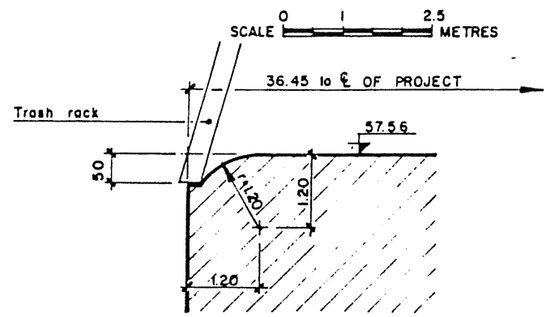
SECTION B



VIEW ALONG C



DETAIL 1



SCALE 0 2 4 8 10 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

POWER PLANT

Cross - sections

SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED	REPORT 340461 R4	DRAWING No NE.17
		DATE JUNE 1986	

SECTION AT ELEVATION 56.50

SECTION AT ELEVATION 63.50

UPSTREAM

DOWNSTREAM

Bulb axis

Waterstop

Dewatering and drainage sump

Dewatering pit

Metallic pipe 200mm dia

Passenger elevator

Freight elevator

(57.56)

(56.50)

(55.00)

(54.70)

300/50

350/25

30.75

92.25

61.35

24.90

18.00

STANDARD PIER HEAD

SCALE 0 1 2 2.5 METRES

Elliptic curve

PIER HEAD WITH JOINT

Waterstop

Elliptic curve

℄ OF BULB UNIT RUNNER

℄ OF PROJECT

LEGEND

1. OIL STORAGE TANK Nº 1
2. OIL STORAGE TANK Nº 2
3. DEWATERING GATE VALVES
4. DEWATERING AND DRAINAGE PUMPS

SCALE 0 2 4 8 10 METRES

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

POWER PLANT

Plans at elevation 56.50 and 63.50

SOGREAH Ingenieurs Conseils GRENOBLE - FRANCE

APPROVED

REPORT 34046I R4

DATE JUNE 1986

DRAWING No NE.18

UPSTREAM

DOWNSTREAM

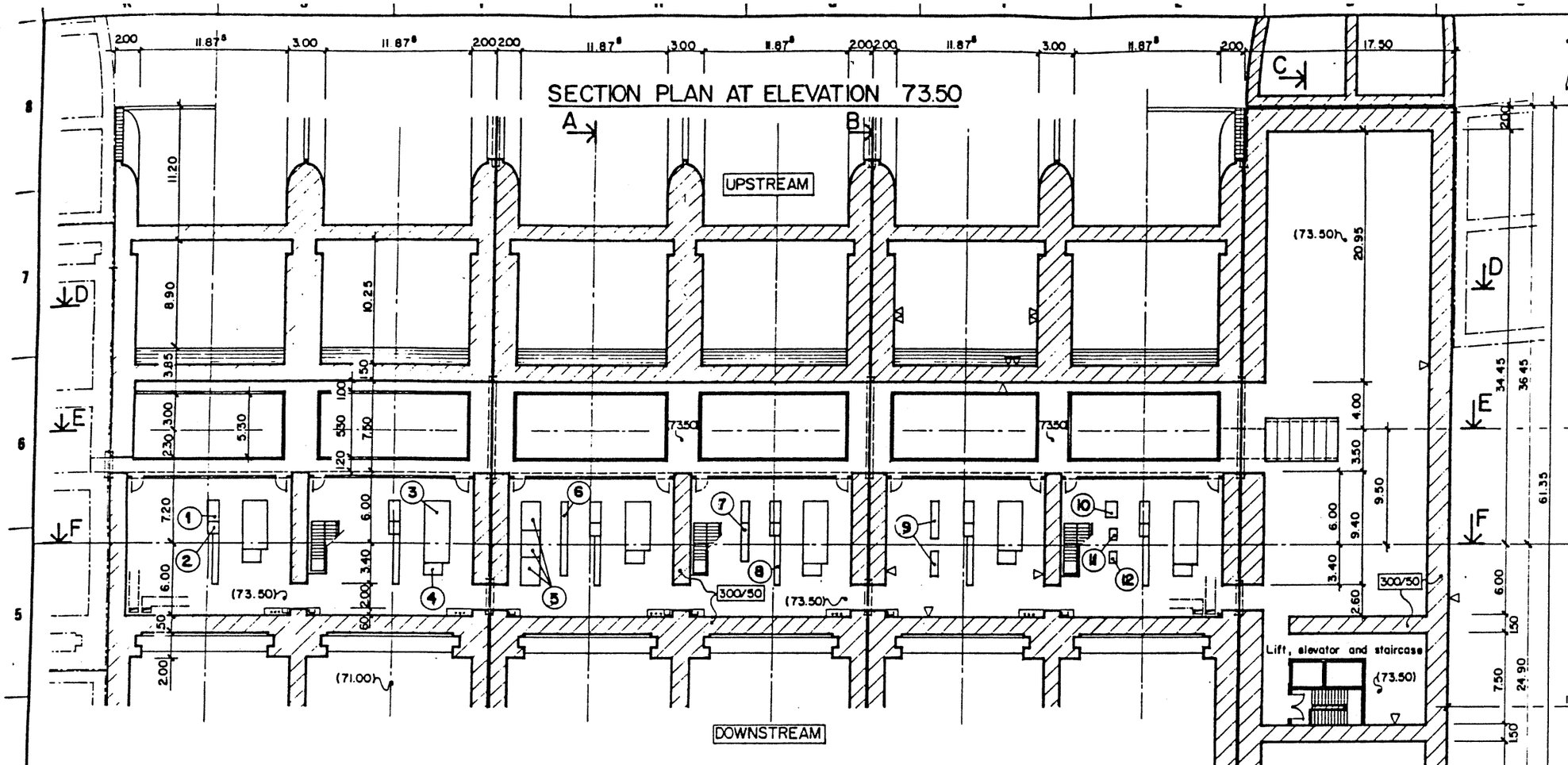
LEGEND

1. TURBINE AIR/OIL TANK
2. TURBINE OIL SUMP
3. LOW PRESSURE AIR COMPRESSED EQUIPMENT.
4. HIGH PRESSURE AIR COMPRESSED EQUIPMENT.
5. COOLING EQUIPMENT FOR AIR CONDITIONING SYSTEM.
6. MAIN TRANSFORMER FIRE PROTECTION PUMPS.
7. CABLE TRAY.
8. DUCT FOR PIPES.
9. WATER INTAKE
10. BULB UNIT COOLING EQUIPMENT.
11. OIL TANK
12. OIL TREATMENT PLANT.
13. SANITARY WATER EQUIPMENT
14. VENTILATION AIR DUCTS

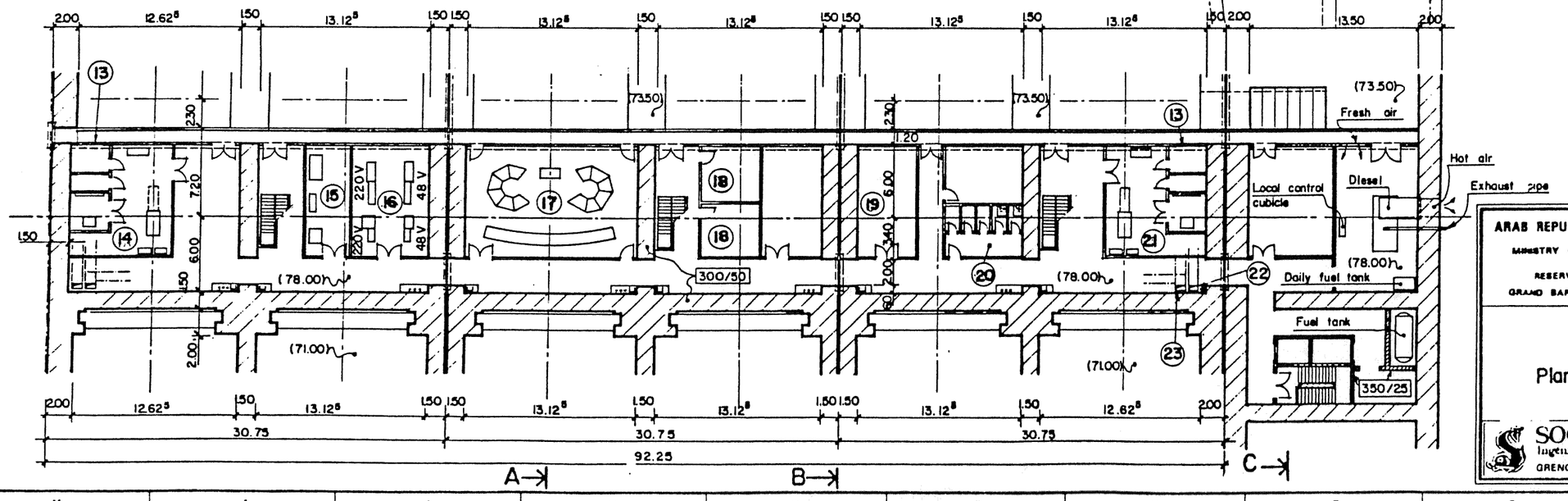
SCALE 0 2 4 8 10 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS
POWER PLANT Plan at elevation 71.00	
SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED REPORT 340461 R4 DATE JUNE 1986 DRAWING No. NE.19

SECTION PLAN AT ELEVATION 73.50



SECTION PLAN AT ELEVATION 78.00



LEGEND

1. NEUTRAL CELL.
2. EXCITATION CUBICLE.
3. MEDIUM VOLTAGE SWITCHGEAR
4. EXCITATION TRANSFORMER
5. AUXILIARY TRANSFORMERS.
6. MAIN AUXILIARY A.C DISTRIBUTION BOARD
7. AUXILIARY DISTRIBUTION BOARD.
8. LOCAL UNIT CUBICLE.
9. COOLING AND VENTILATION SWITCHBOARD.
10. LIGHTING TRANSFORMER
11. LIGHTING CUBICLE.
12. EMERGENCY LIGHTING CUBICLE.
13. FRESH AIR INTAKE.
14. AIR CONDITIONING AND VENTILATION ROOM (UNITS 4-5-6)
15. BATTERY ROOM.
16. D.C EQUIPMENT.
17. CONTROL ROOM.
18. OFFICE.
19. RELAY ROOM.
20. TOILETS.
21. AIR CONDITIONING AND VENTILATION ROOM (UNITS 1-2-3)
22. INLET VENTILATION AIR DUCT.
23. OUTLET VENTILATION AIR DUCT.

℄ OF BULB UNIT RUNNER

℄ OF PROJECT

SCALE 0 2 4 6 8 10 METRES

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

POWER PLANT

Plans at elevation 73.50 and 78.00

SOGREAH Ingénieurs Conseils GRENOBLE - FRANCE

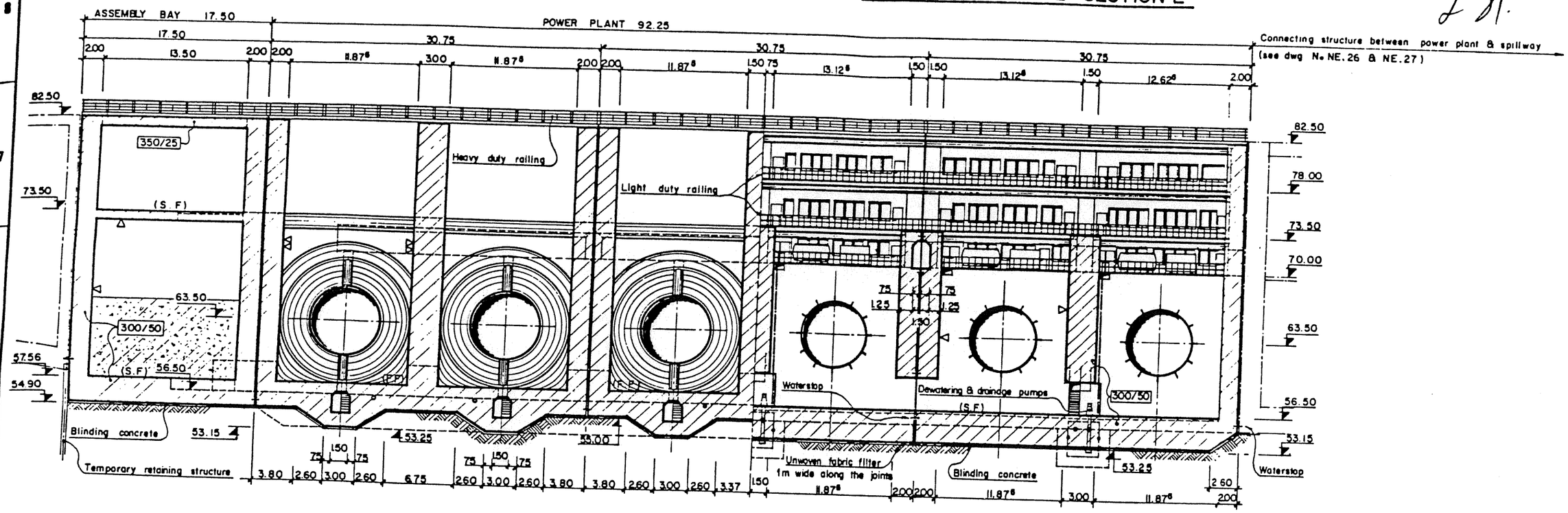
APPROVED

REPORT 340461 R4

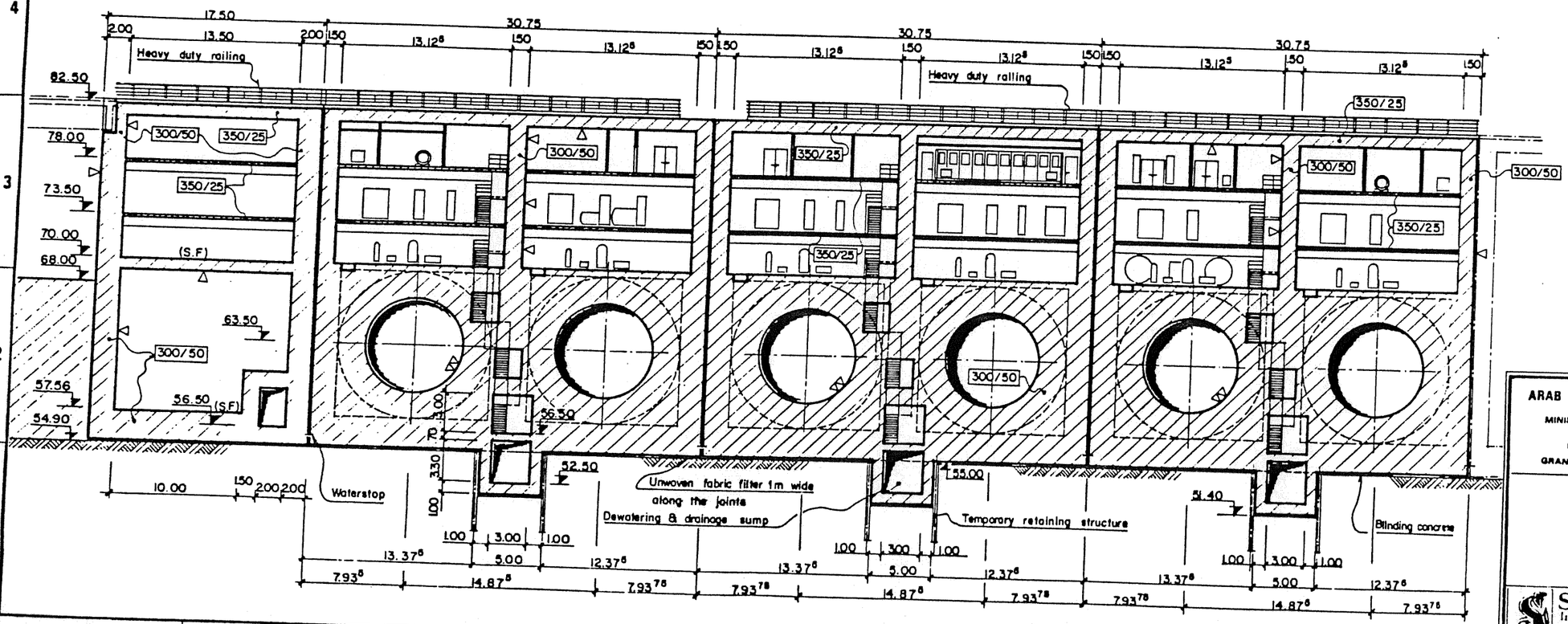
DATE JUNE 1986

DRAWING No. NE.20

HALF LONGITUDINAL SECTION E



LONGITUDINAL SECTION F



SCALE 0 2 4 8 10 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS
POWER PLANT Longitudinal sections	
SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED REPORT 340461 R4 DATE JUNE 1986 DRAWING No. NE.21

UPSTREAM

Spillway upstream protections
(See drawings Nos NE 31 - NE 32)

Connection between Spillway et Power Plant
(See drawing No NE 25)

Slope 2 3

Waterstop

Joints

Carriage way 9.00 m

2% 2% 2% 2%

3‰

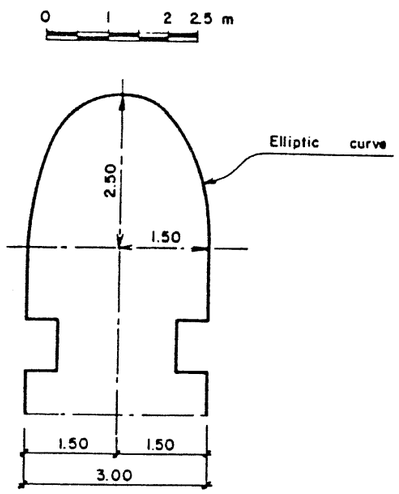
Joint

℄ OF PROJECT AND BRIDGE AXIS

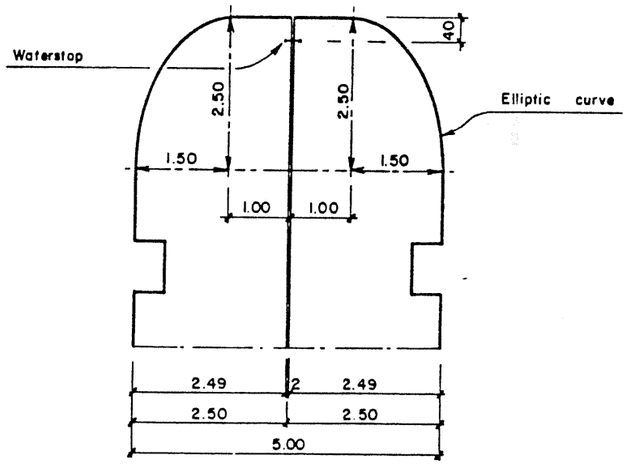
Spillway downstream protections
(See drawings Nos NE 31 - NE 32)

DOWNSTREAM

STANDARD PIER-HEAD



PIER-HEAD WITH JOINT



SCALE 0 2 4 6 8 10 METRES

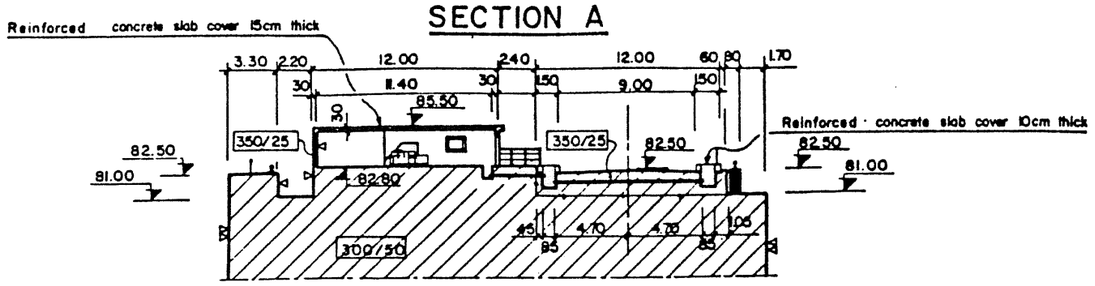
ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

SPILLWAY

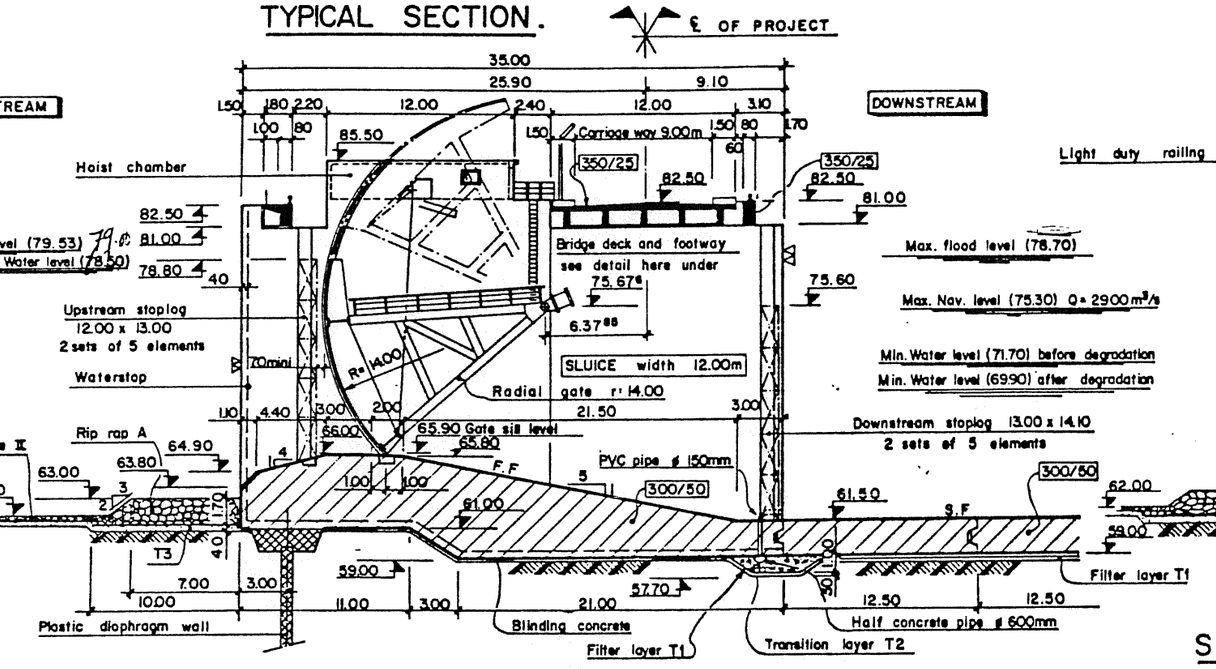
Partial plan view

SOGREAH Ingénieurs Conseils GRENOBLE - FRANCE	APPROVED	REPORT 340461 R4	DRAWING No. NE.22
		DATE JUNE 1986	

SECTION A

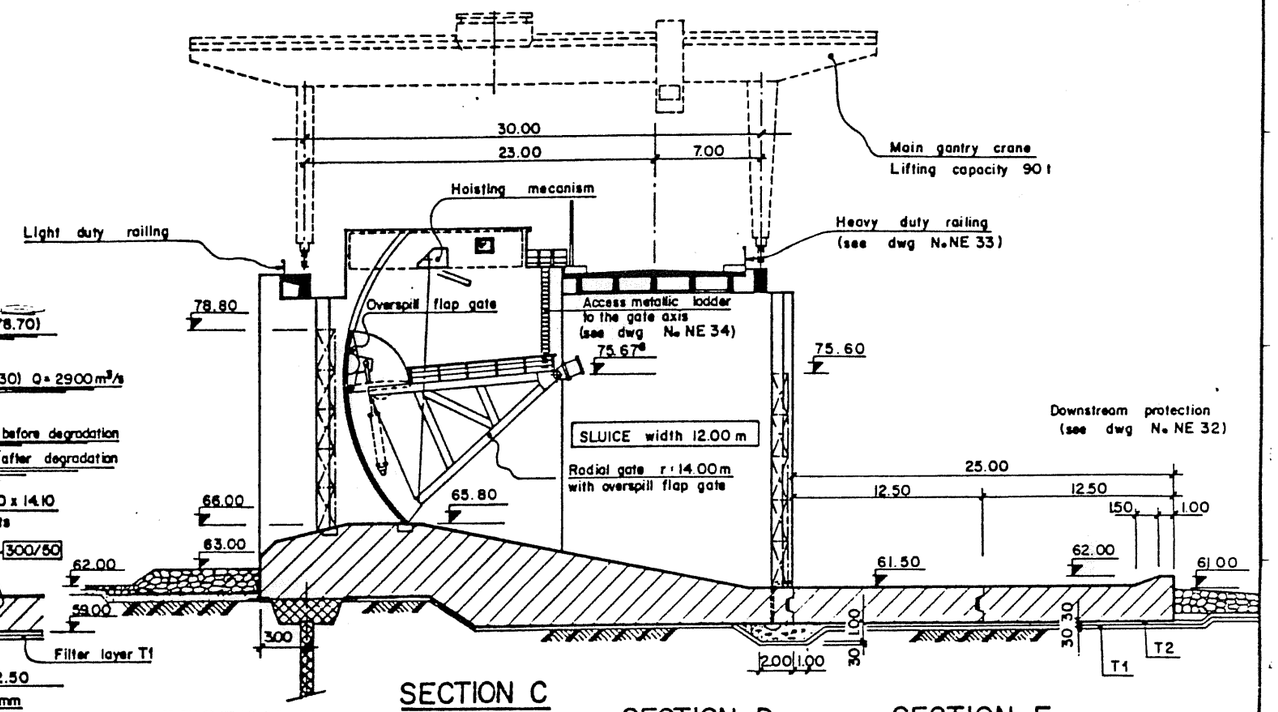


TYPICAL SECTION.

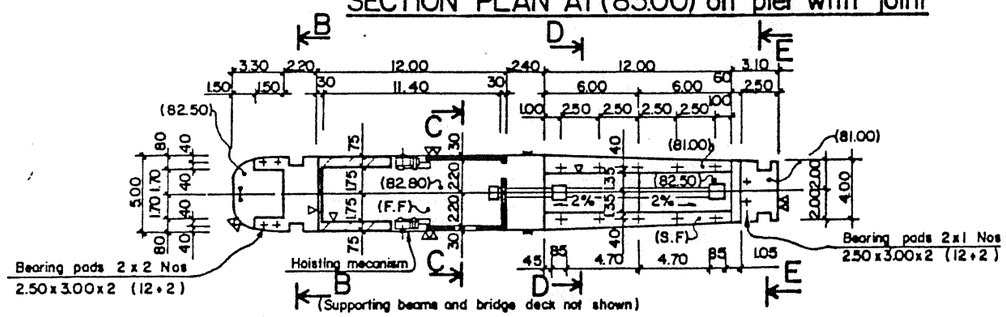


CROSS SECTION THROUGH THE TWO ENDS SLUICE

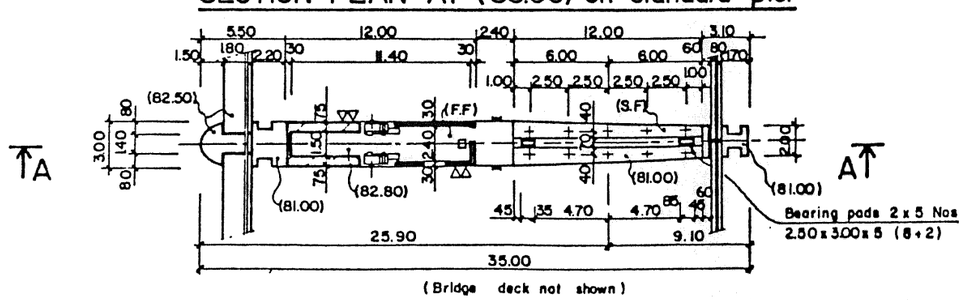
All levels and dimensions identical to typical section



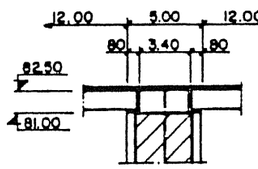
SECTION PLAN AT (83.00) on pier with joint


Bearing pads 2 x 2 Nos
2.50 x 3.00 x 2 (12+2)
Bearing pads 2 x 1 Nos
2.50 x 3.00 x 2 (12+2)
Hoisting mecanism
(Supporting beams and bridge deck not shown)

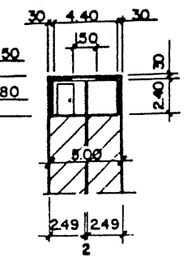
SECTION PLAN AT (83.00) on standard pier



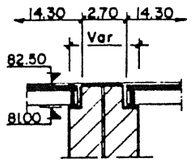
SECTION B



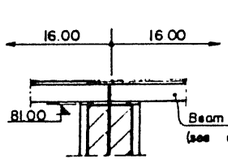
SECTION C



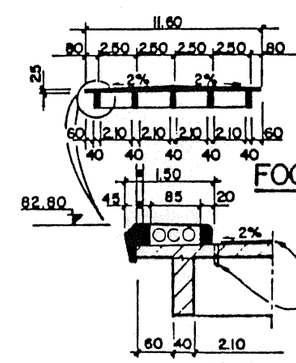
SECTION D



SECTION E



DECK CROSS SECTION



FOOTWAY DETAIL

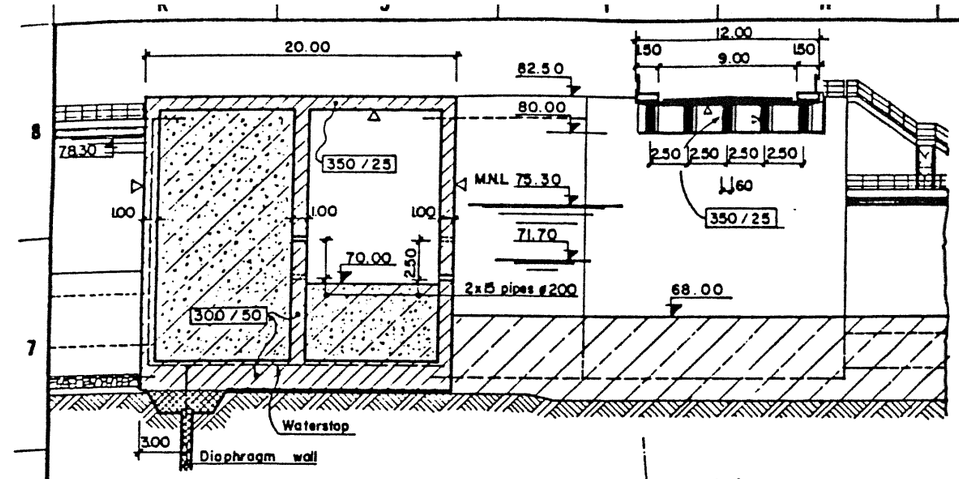
NOTE : This drawing is to be read in conjunction with drawing N° NE 22

SCALE 0 2 4 8 10 METRES

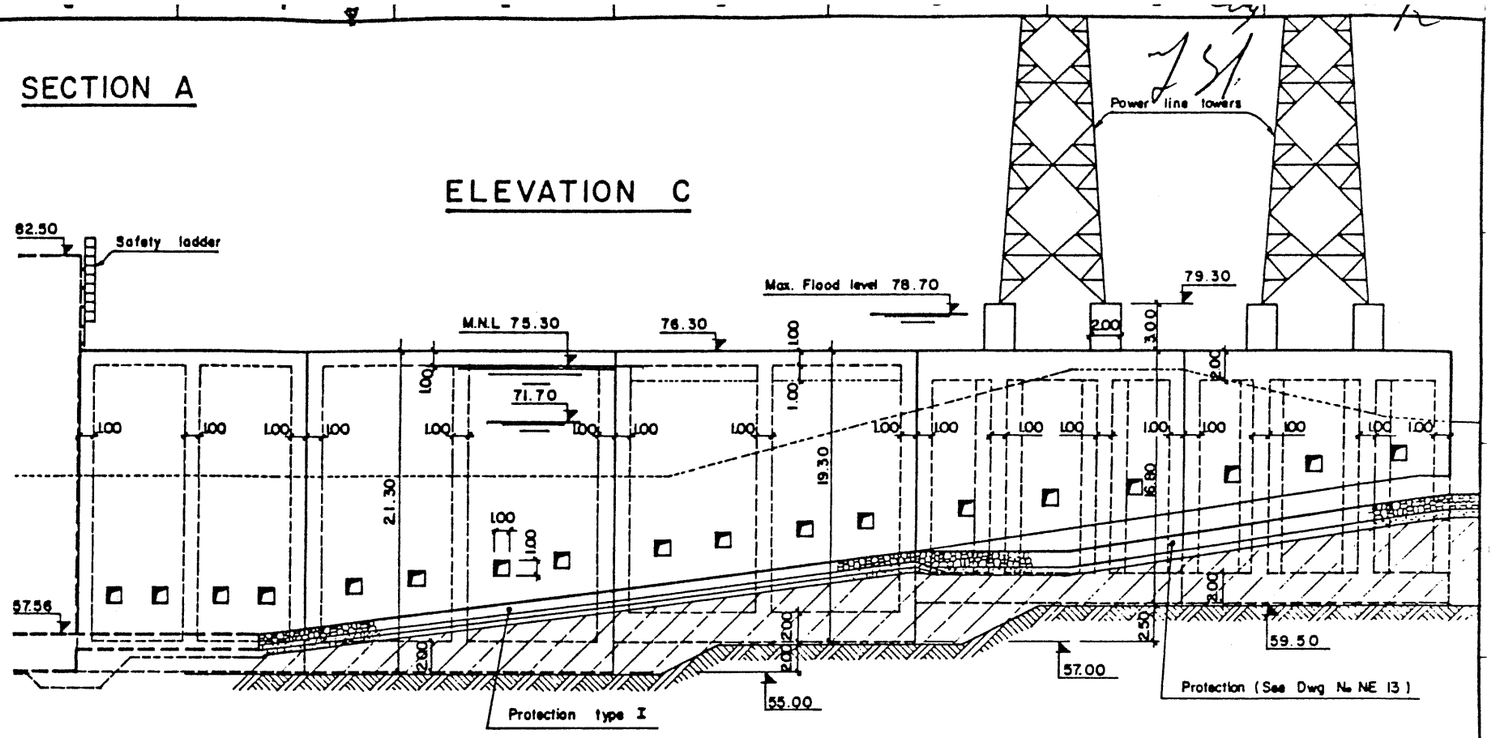
ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS
SPILLWAY Sections and details	
SOGREAH Ingénieurs Conseils GRENOBLE FRANCE — APPROVED — REPORT 340461 R4 — DATE JUNE 1986	DRAWING N° NE.23

Drawn: B Rod Checked: J.G.

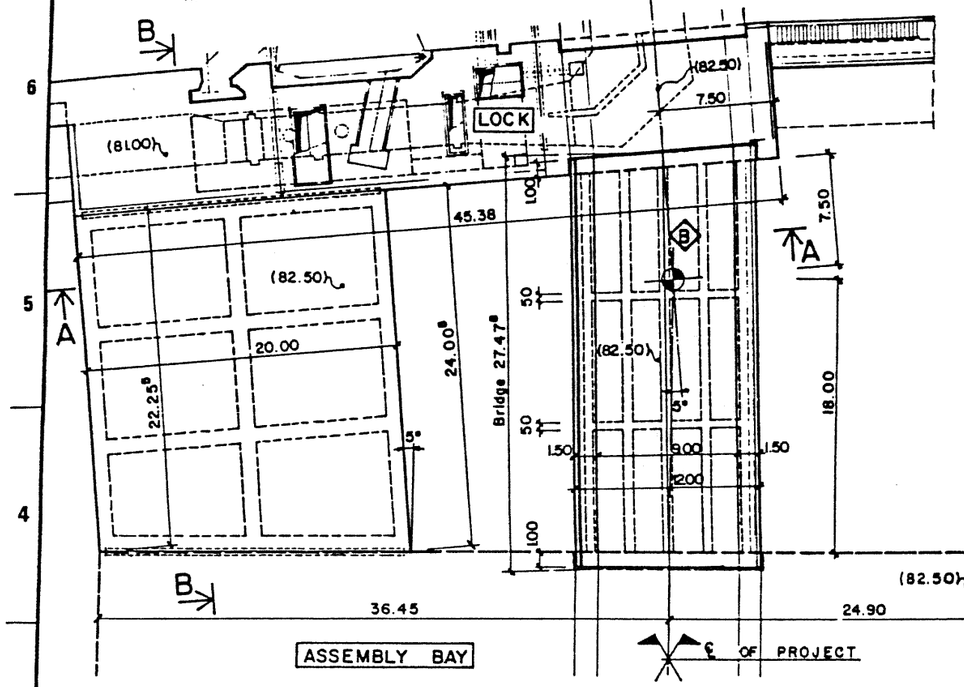
SECTION A

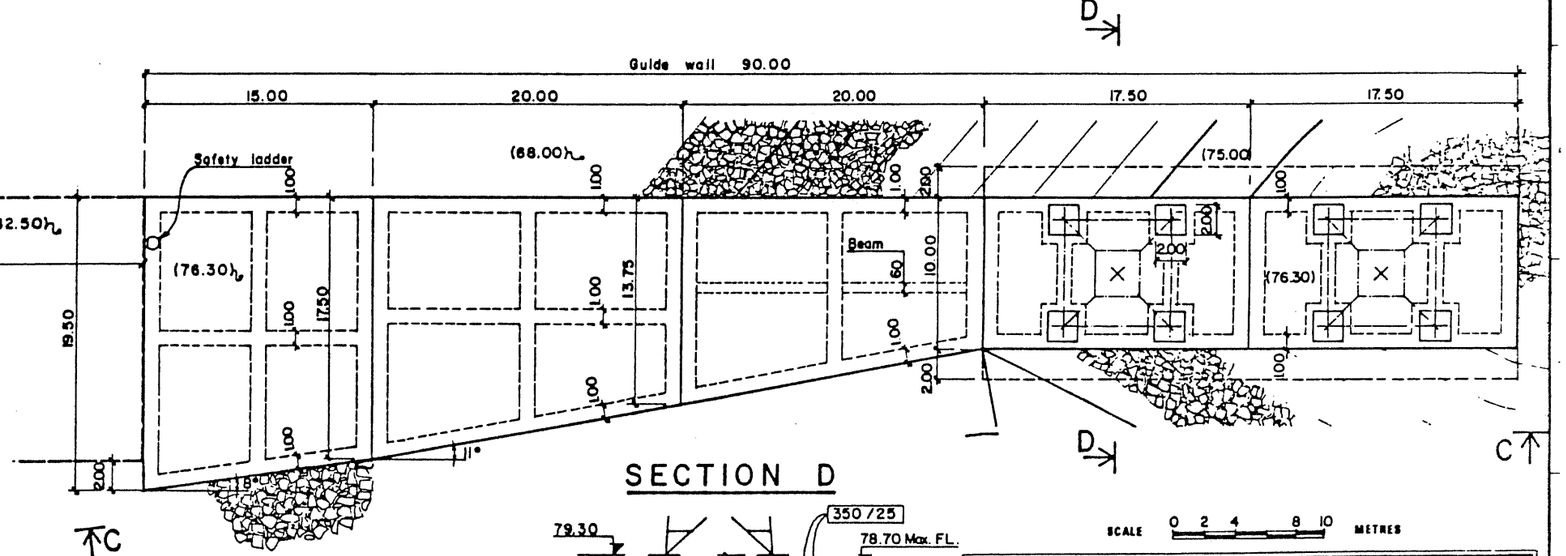


ELEVATION C

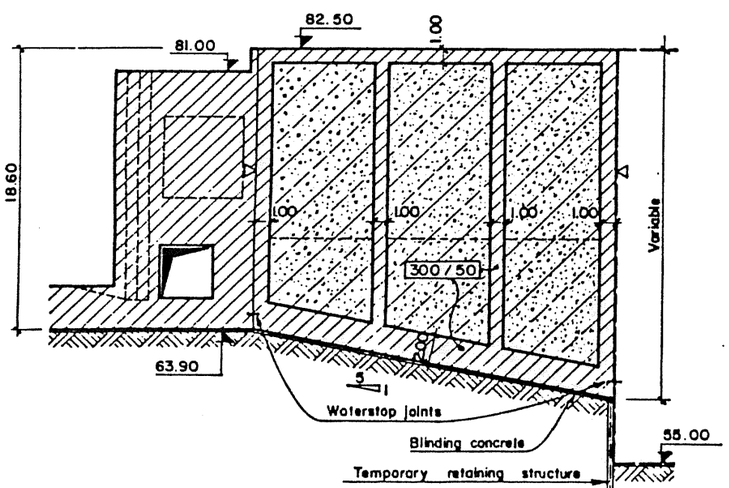


PLAN VIEW

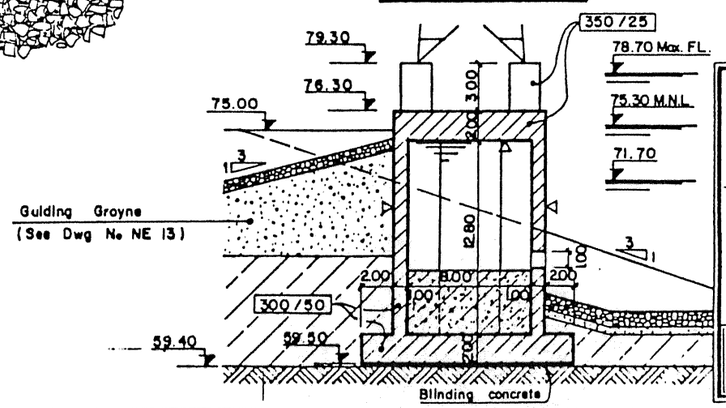




SECTION B



SECTION D



SCALE 0 2 4 8 10 METRES

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

CONNECTING STRUCTURES
Between Lock and Power Plant

SOGREAH Ingénieurs Conseils GRENOBLE - FRANCE

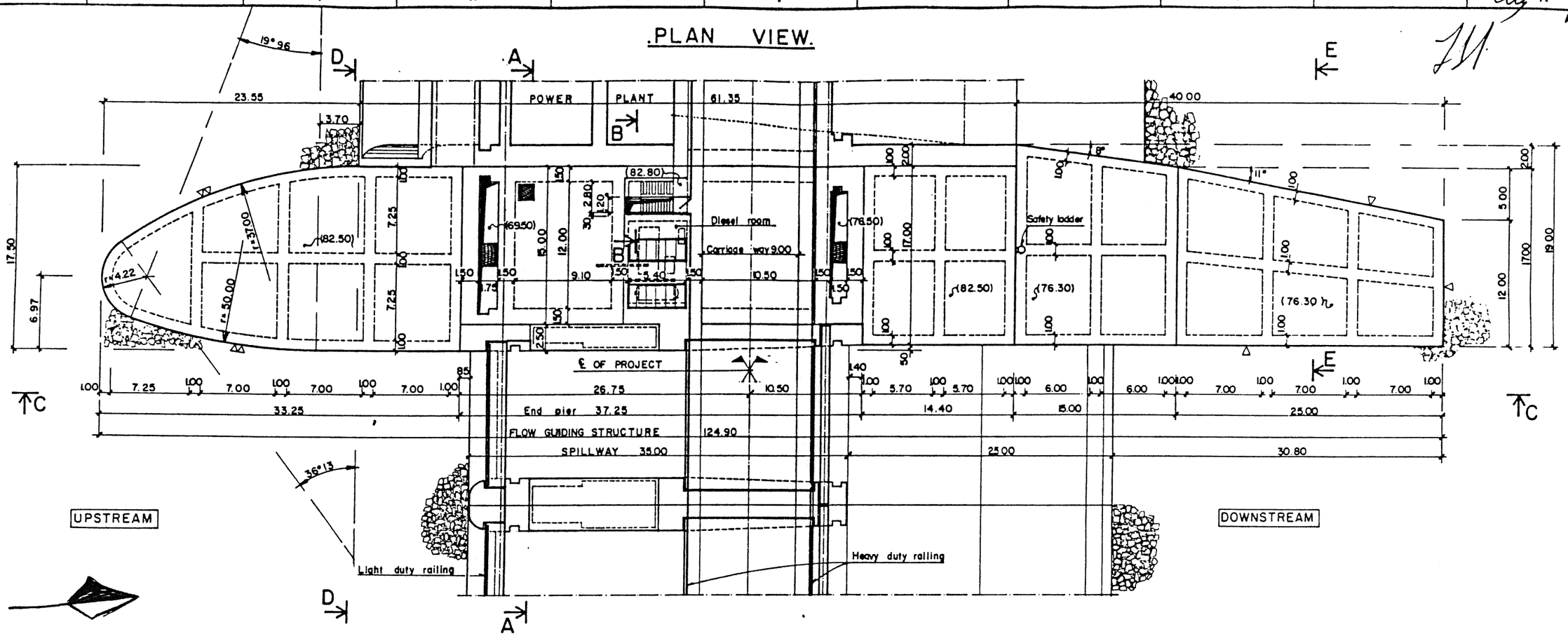
APPROVED

REPORT 340461 R4

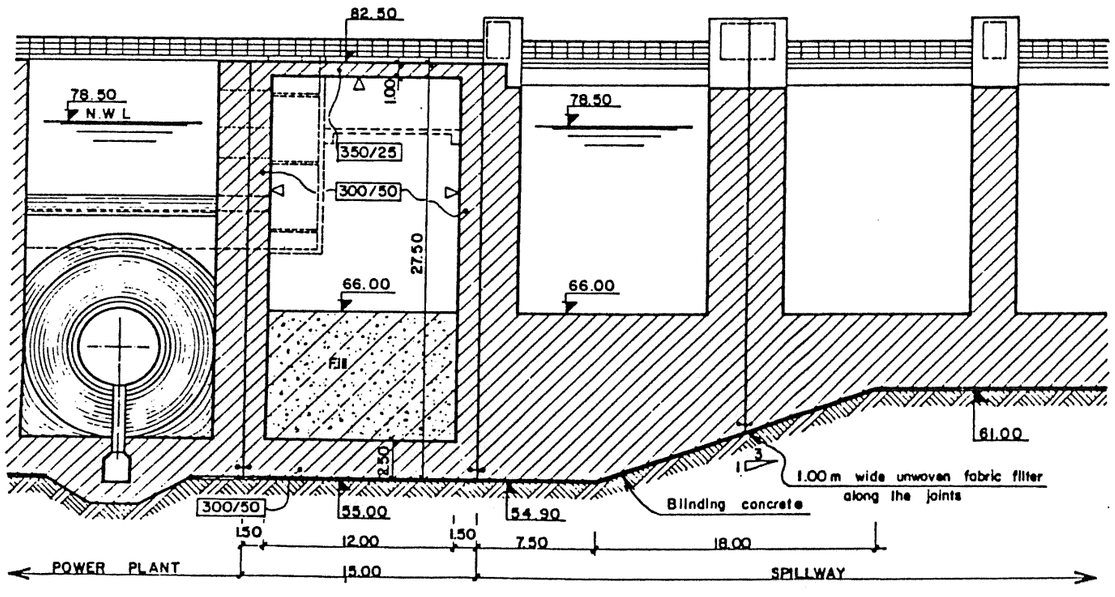
DATE JUNE 1986

DRAWING No. NE.24

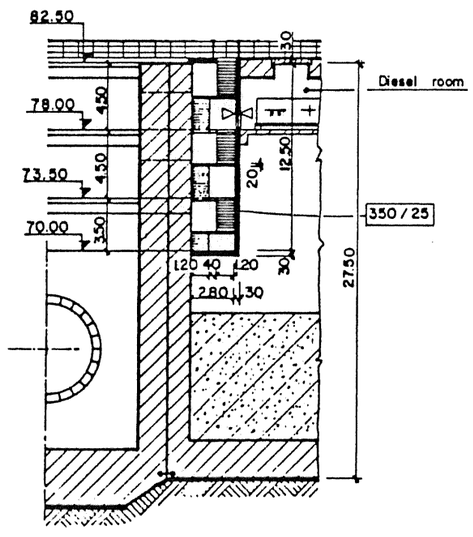
.PLAN VIEW.



.SECTION A.



.SECTION B.



SCALE 0 2 4 8 10 METRES

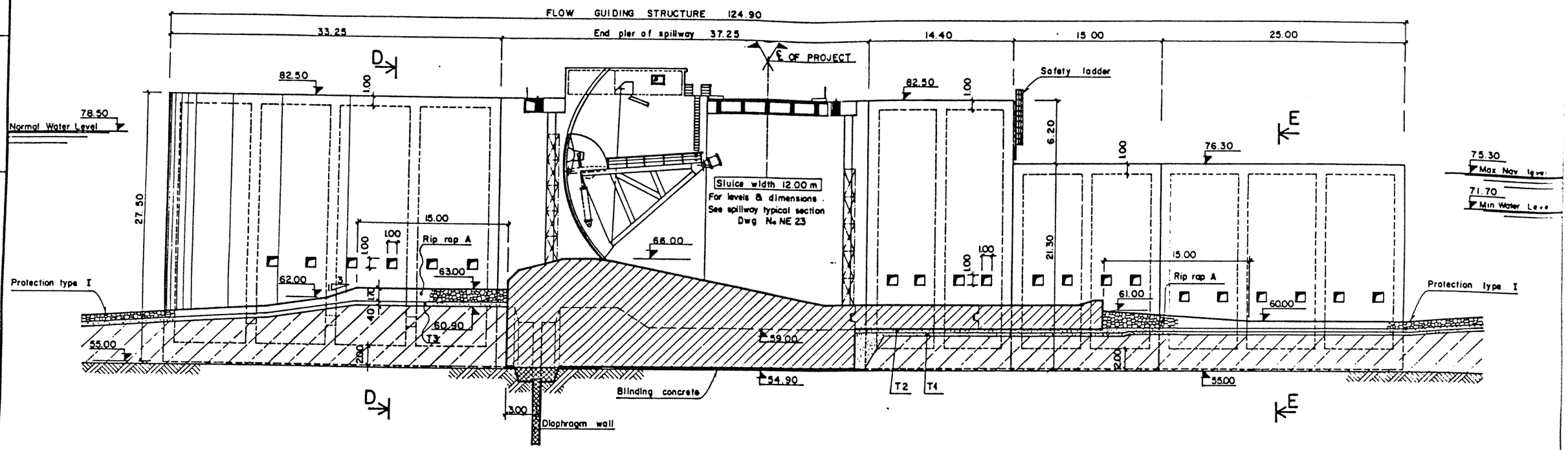
ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

CONNECTING STRUCTURES

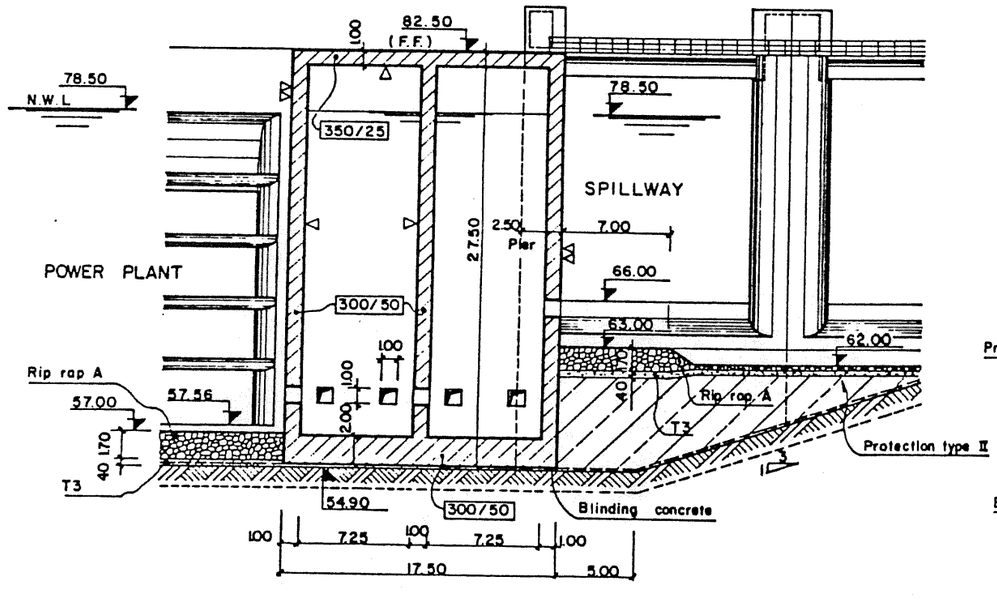
Between Power Plant and Spillway. N°1

SOGREAH Ingénieurs Conseils GRENOBLE . FRANCE	APPROVED	REPORT 340461 R4	DRAWING No
		DATE JUNE 1986	NE.25

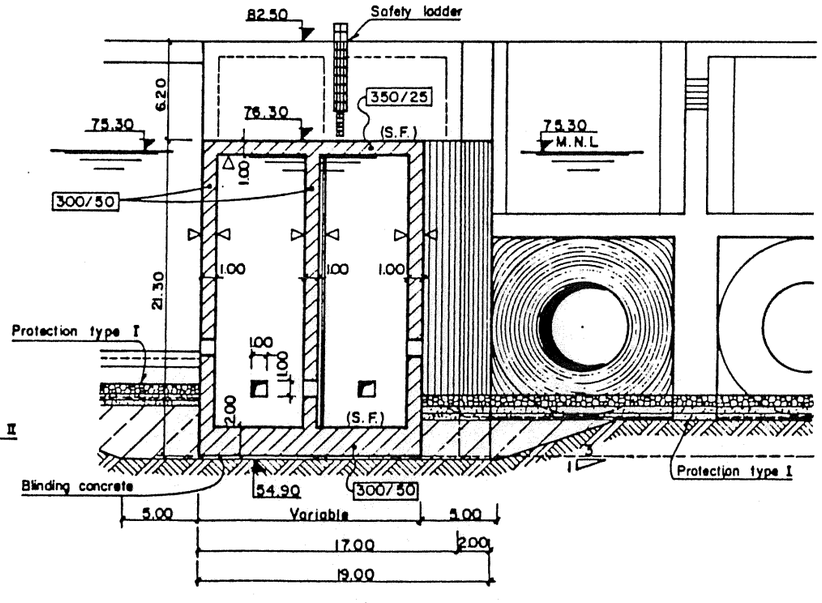
.SECTION C.



.SECTION D.

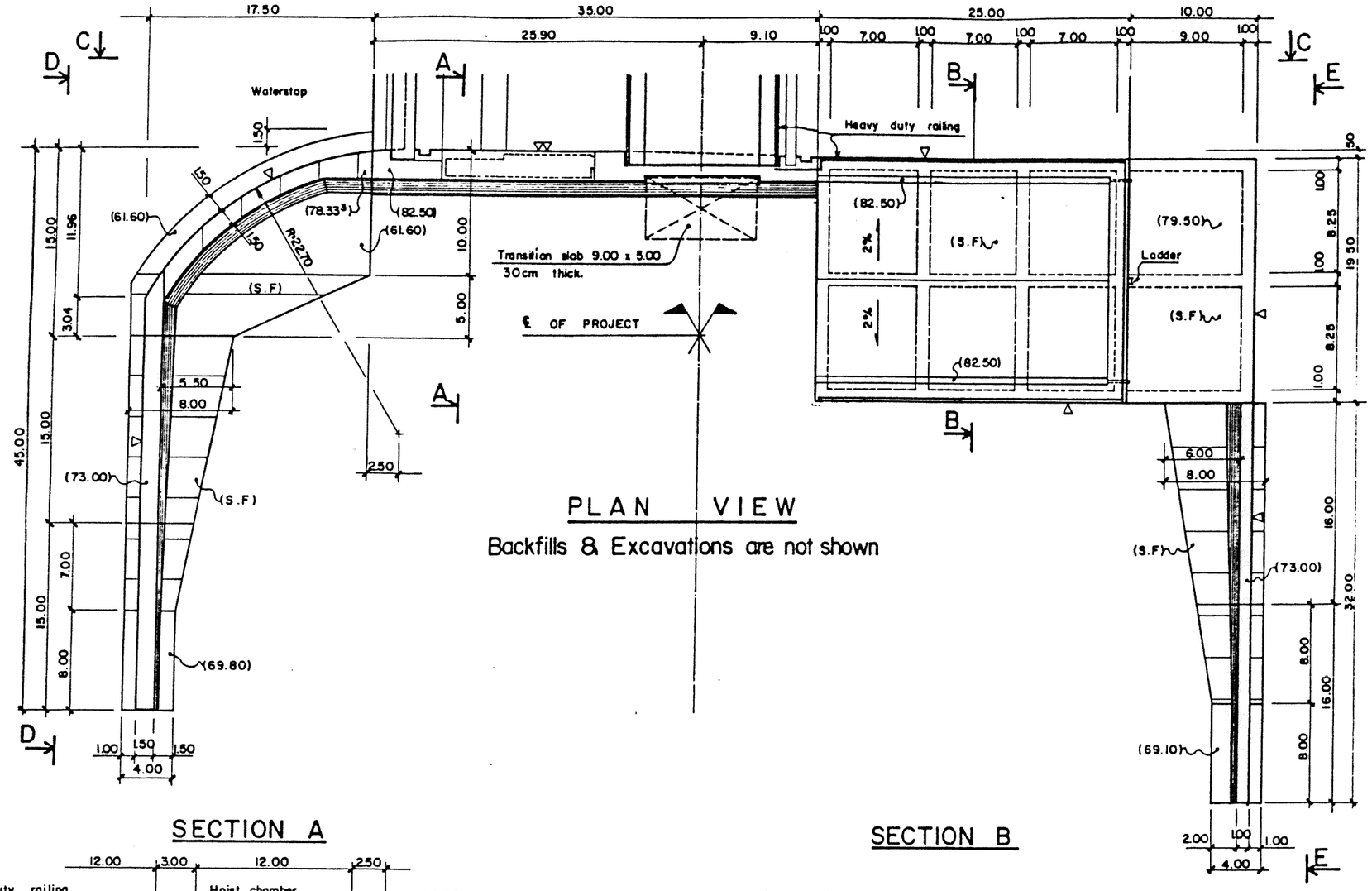


.SECTION E.



SCALE 0 2 4 8 10 METRES

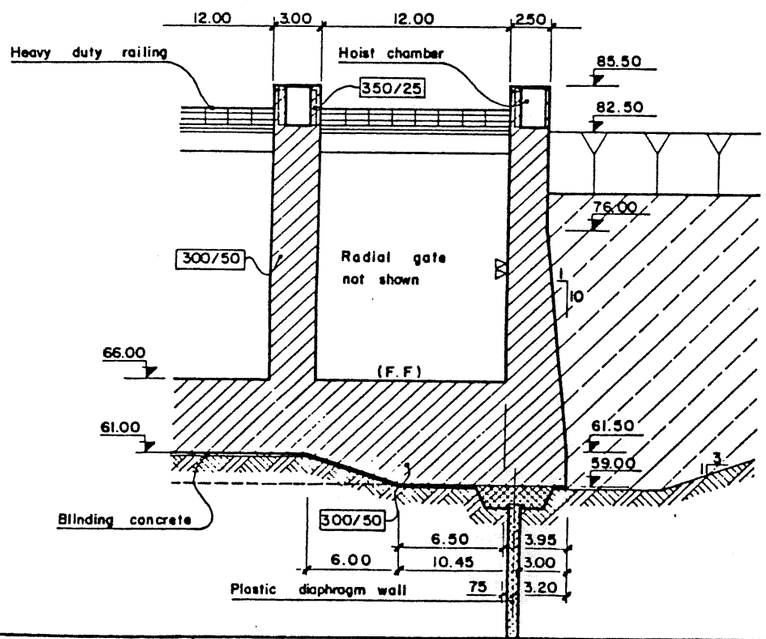
ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS		
CONNECTING STRUCTURES Between Power Plant and Spillway. N° 2			
SOGREAH Ingenieurs Conseils GRENOBLE - FRANCE	APPROVED	REPORT 340461 R4	DRAWING No
	DATE JUNE 1986		NE.26



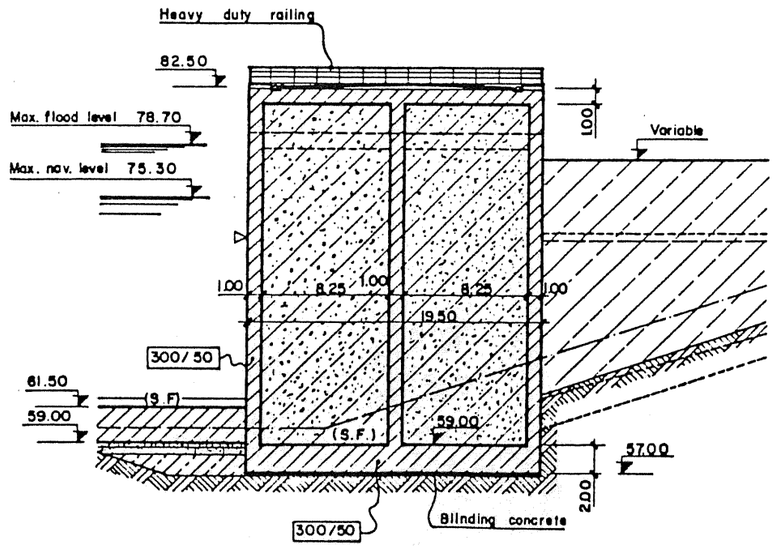
PLAN VIEW

Backfills & Excavations are not shown

SECTION A



SECTION B



SCALE 0 2 4 8 10 METRES

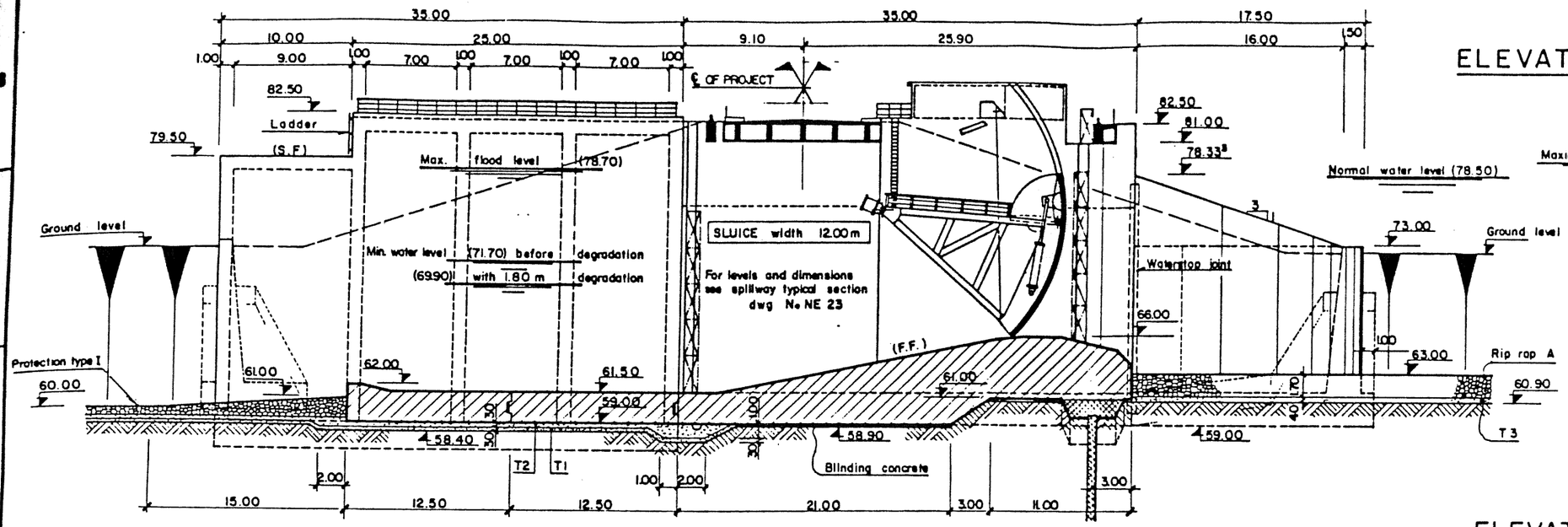
ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

CONNECTING STRUCTURES

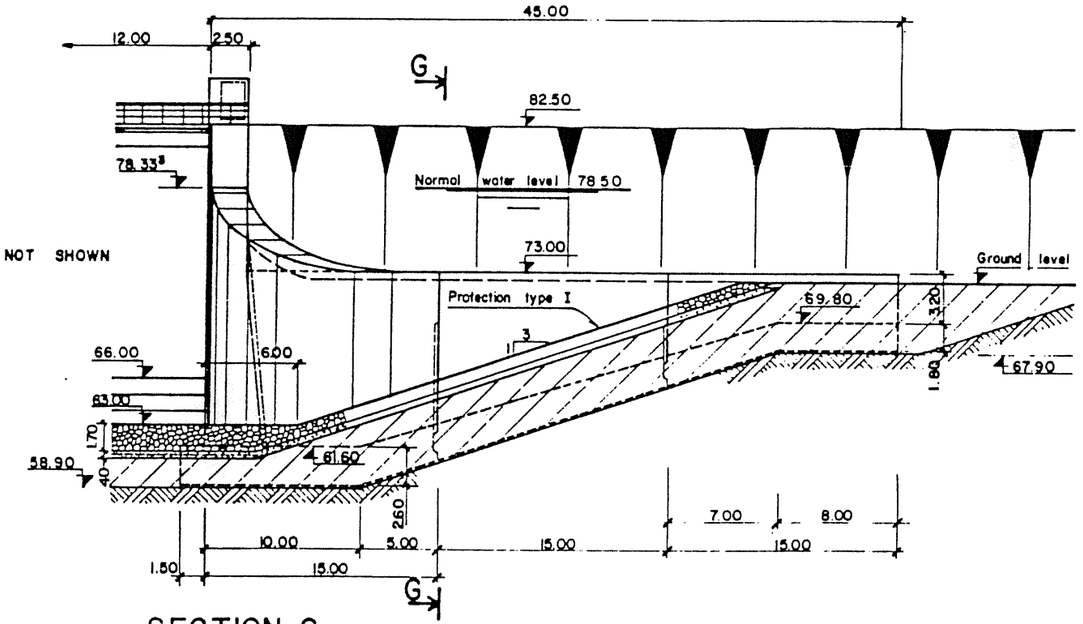
Between Spillway and Closure Dam . N°1

SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DRAWING No NE.27

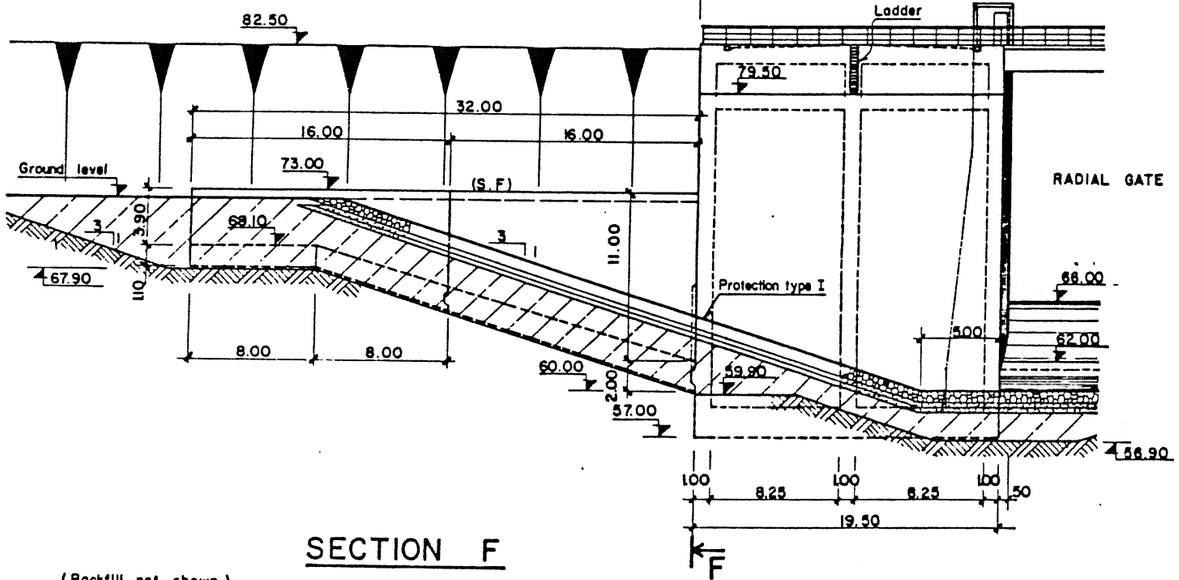
ELEVATION C



ELEVATION D

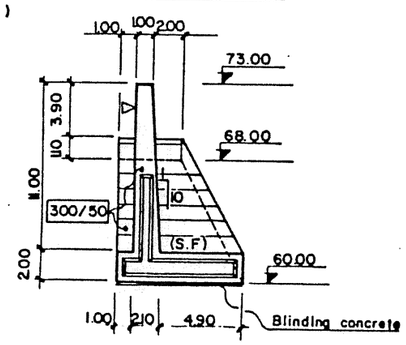


ELEVATION E



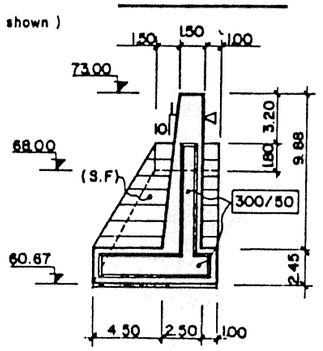
SECTION F

(Backfill not shown)



SECTION G

(Backfill not shown)



SCALE 0 2 4 8 10 METRES

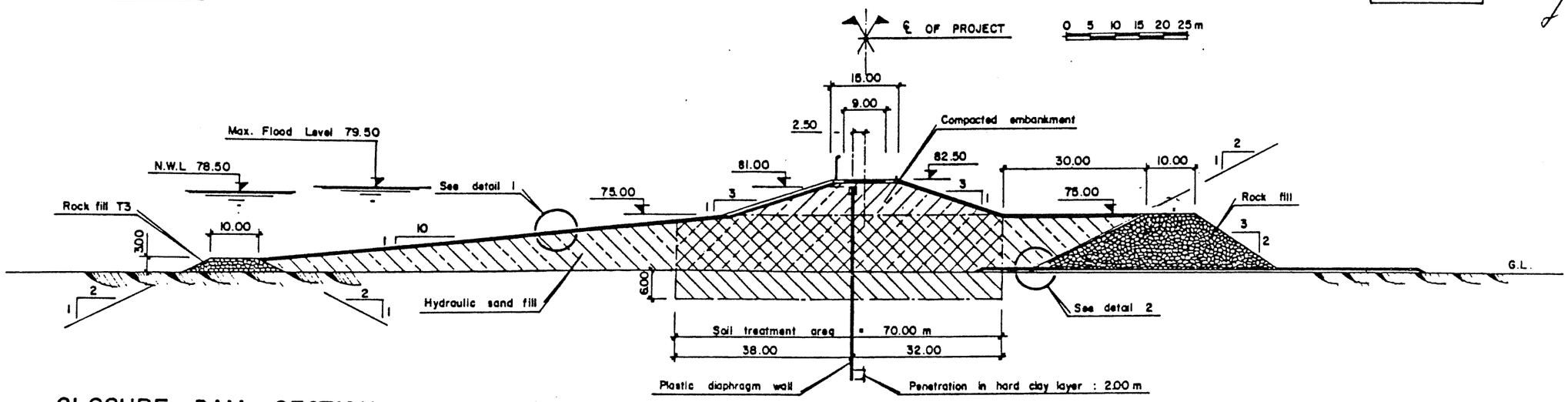
ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

CONNECTING STRUCTURES

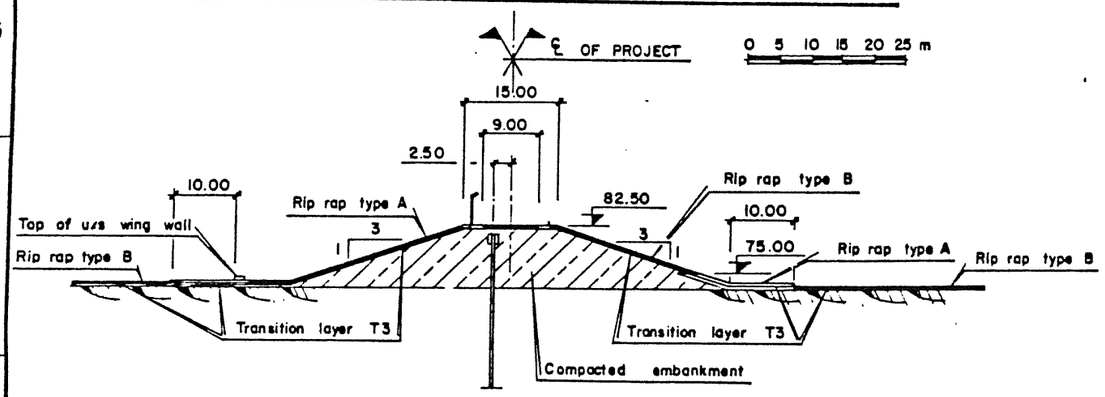
Between Spillway and Closure Dam . N°2

SOGREAH Ingenieurs Conseils GRENOBLE FRANCE	APPROVED	REPORT 340461 R4	DRAWING No
		DATE JUNE 1986	NE.28

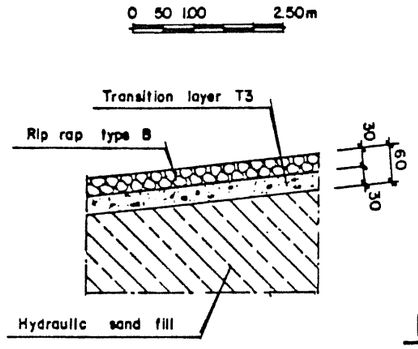
CLOSURE DAM SECTION



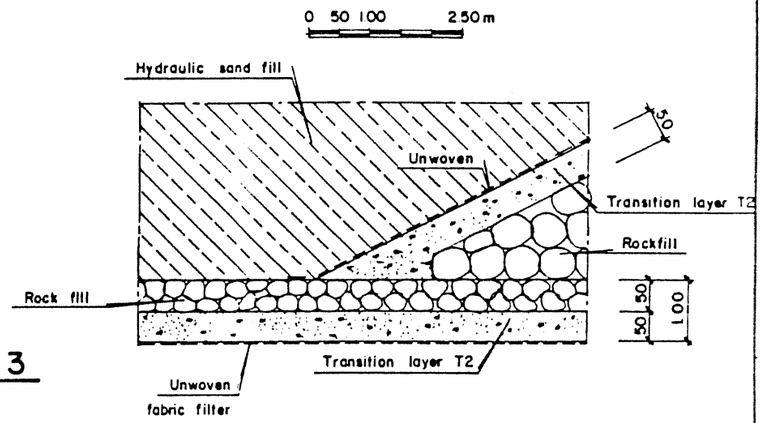
CLOSURE DAM SECTION BETWEEN U/S WING WALL AND COFFERDAM



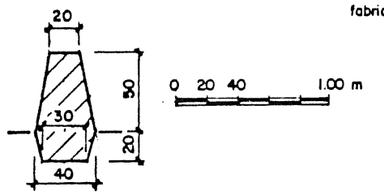
DETAIL 1



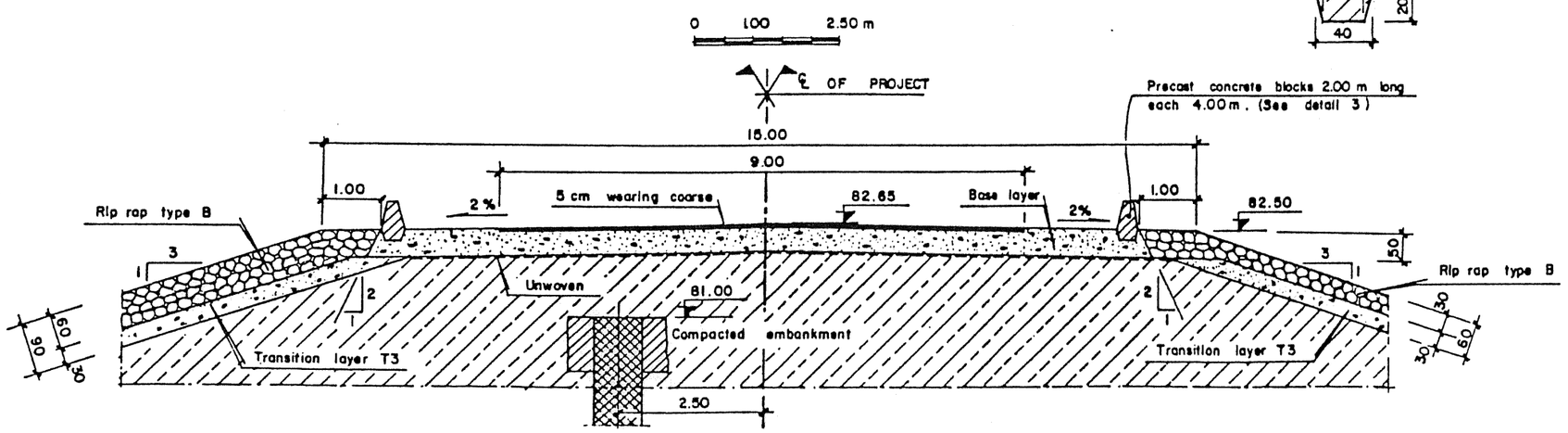
DETAIL 2



DETAIL 3



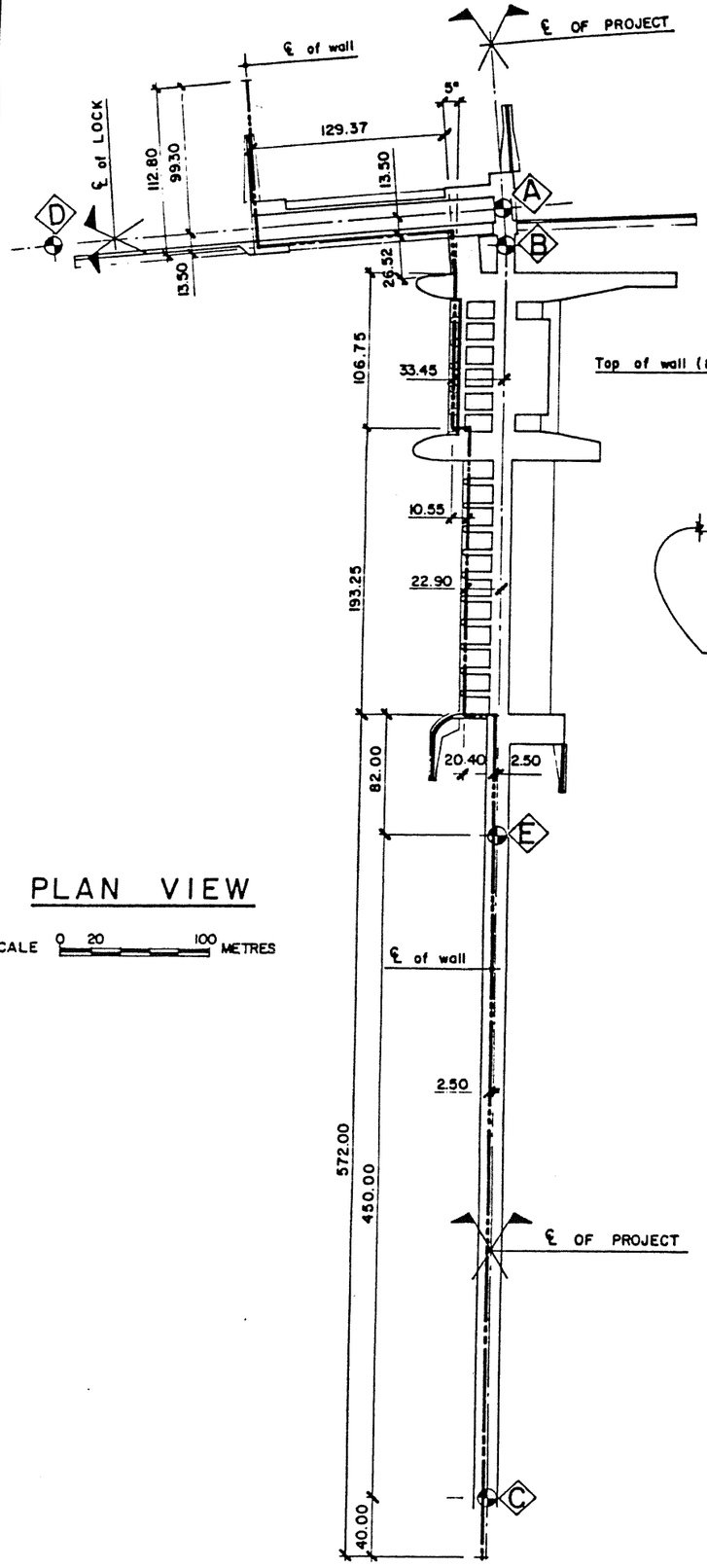
ROADWAY TYPICAL CROSS SECTION IN CLOSURE DAM



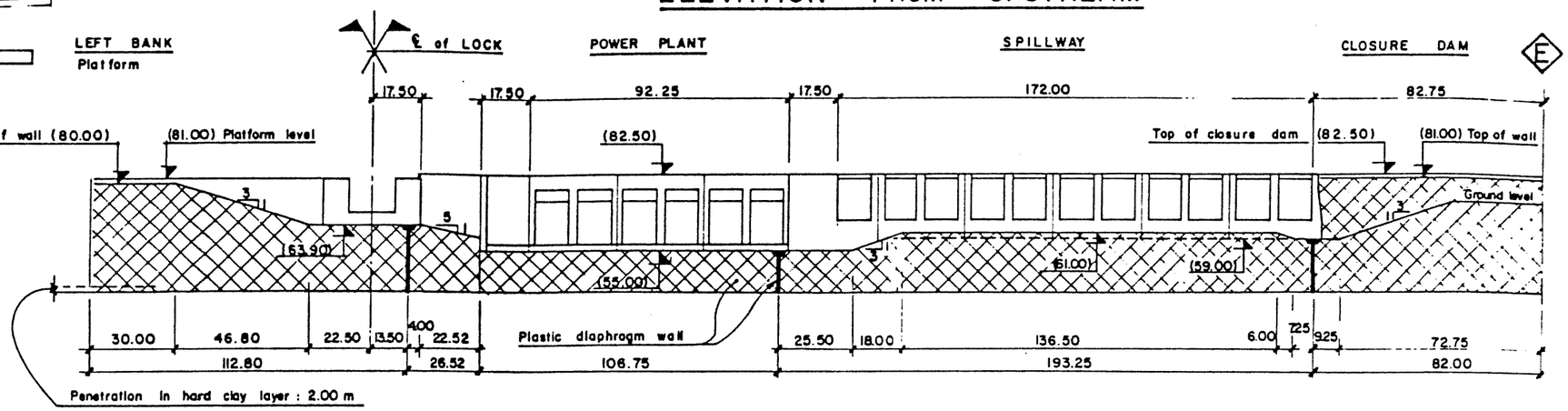
ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS
CLOSURE DAM	
SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED REPORT 340461 R4 DATE JUNE 1986 DRAWING No NE.29

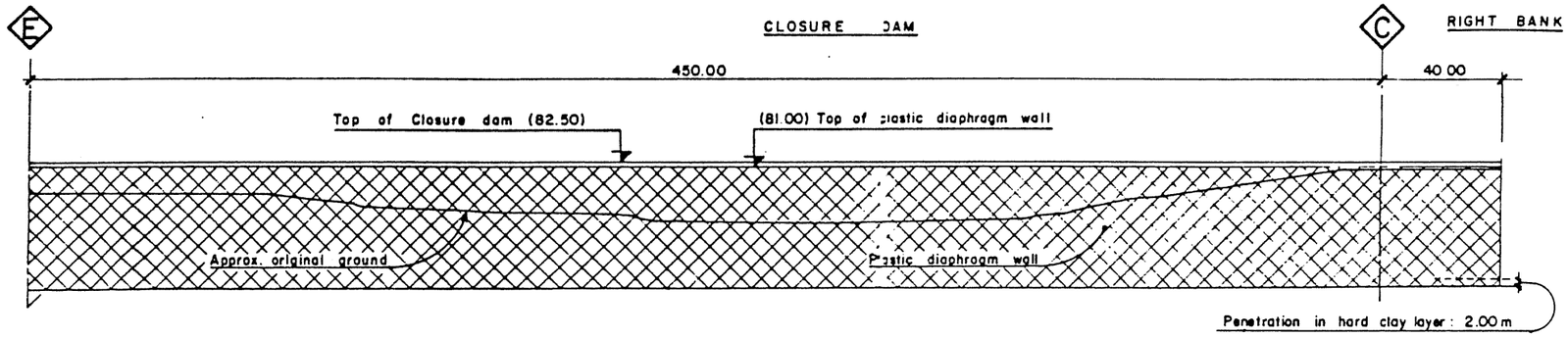
PLAN VIEW

SCALE 0 20 100 METRES

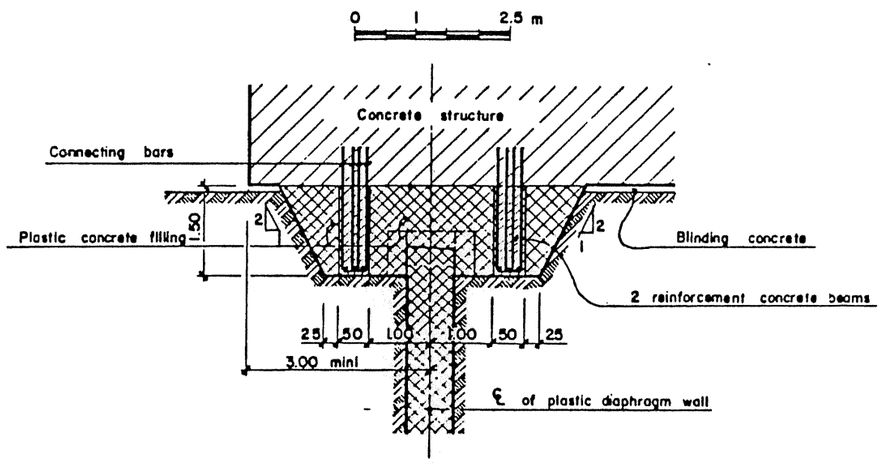


ELEVATION FROM UPSTREAM





PRINCIPLE OF THE CONNECTION BETWEEN DIAPHRAGM WALL & CONCRETE STRUCTURE



SCALE 0 10 50 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

FINAL CUT-OFF

SOGREAH Ingenieurs Conseils GRENOBLE FRANCE	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DRAWING No NE.30

UPSTREAM

DOWNSTREAM

NILE RIVER

Spoil Bank Area

LEGEND OF PROTECTIONS

(See details on dwg N°NE.32)

Protections type I

Protections type II

Protections type III

SCALE 0 100 METRES

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND
GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

RIP-RAP PROTECTIONS

Plan view

SOGREAH Ingenieurs Conseils
GRENOBLE - FRANCE

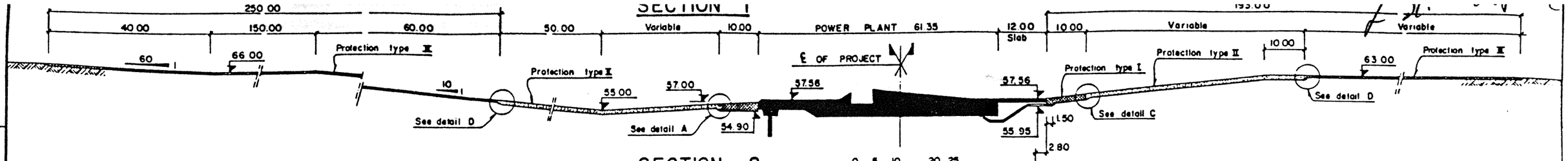
APPROVED

REPORT 340461 R4

DATE JUNE 1986

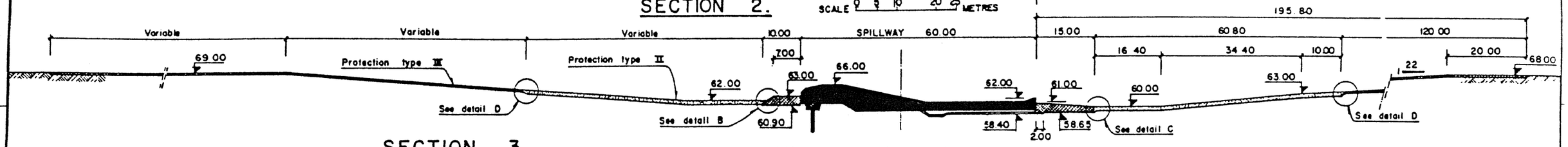
DRAWING No.
NE.31

SECTION 1

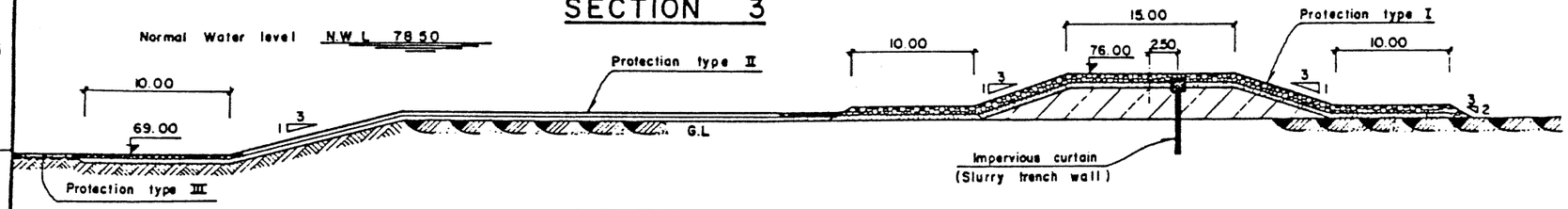


SECTION 2.

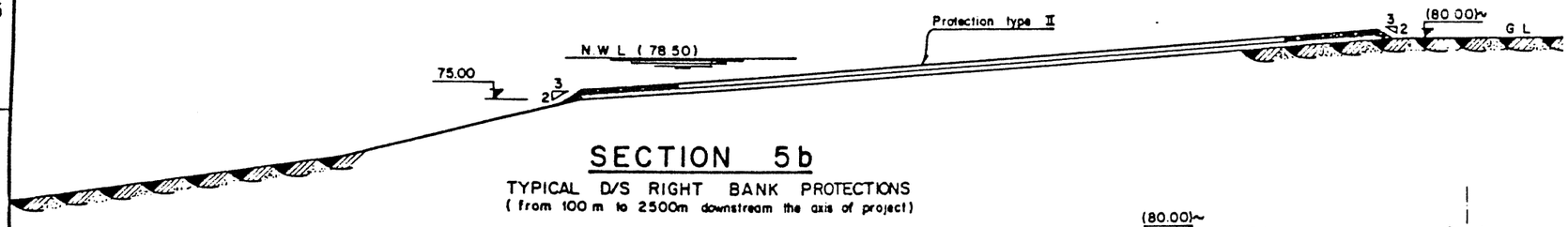
SCALE 0 5 10 20 25 METRES



SECTION 3



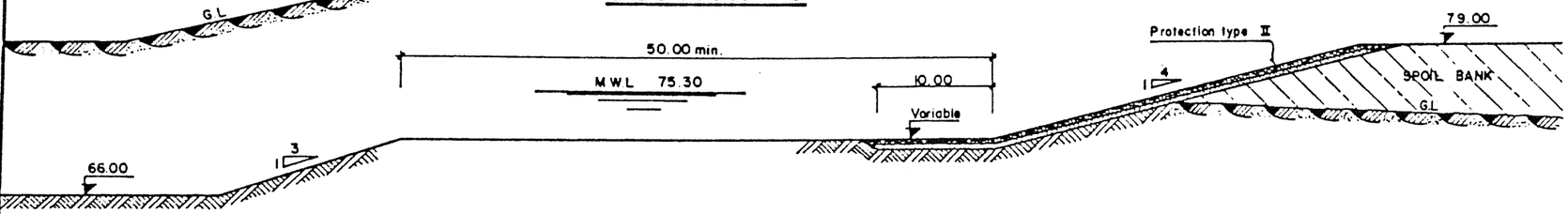
SECTION 4



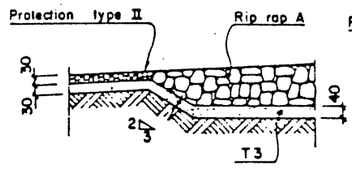
SECTION 5b

TYPICAL D/S RIGHT BANK PROTECTIONS
(from 100 m to 2500m downstream the axis of project)

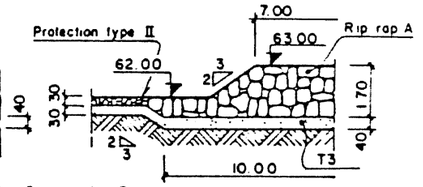
SECTION 6



DETAIL A

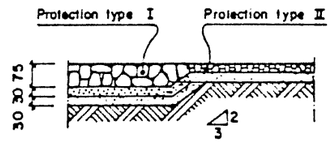


DETAIL B

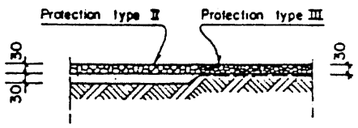


SCALE 0 1 2 4 5 METRES

DETAIL C

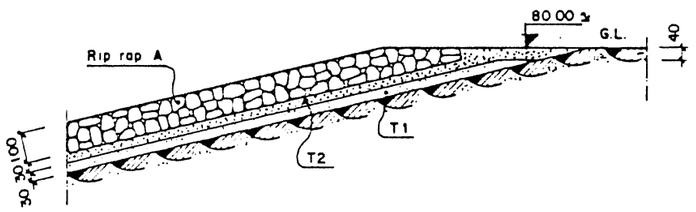


DETAIL D



SECTION 5a

TYPICAL D/S RIGHT BANK PROTECTIONS
(from axis of project to 100 m downstream)

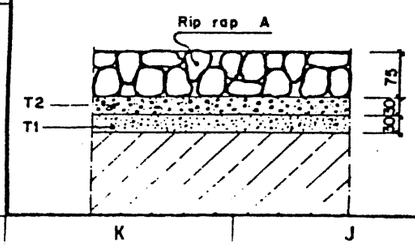


SCALE 0 2.5 5 10 12.5 METRES

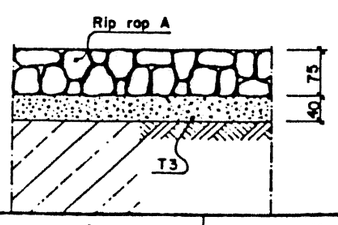
DETAILS OF PROTECTIONS

SCALE 0 0.5 1 2 2.5 METRES

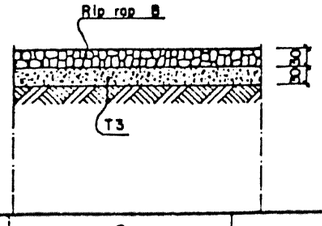
TYPE I
(IMMEDIATE D/S OF CONCRETE STRUCTURES)



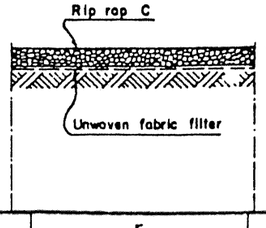
TYPE I
(GENERAL)



TYPE II



TYPE III



NOTA
This drawing is to be read in conjunction with drawing Nº NE.31

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

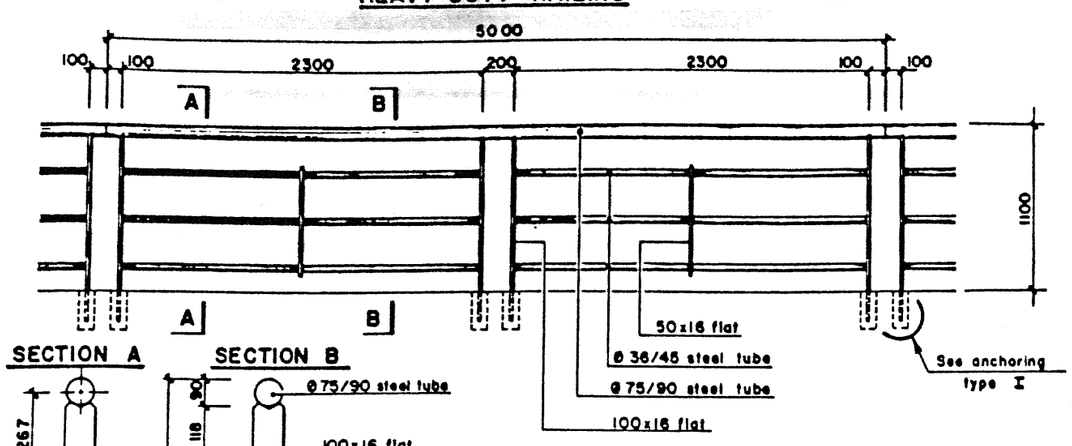
NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

RIP-RAP PROTECTIONS
Sections

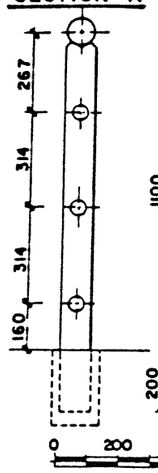
SOGREAH Ingénieurs Conseils GRENOBLE FRANCE | APPROVED | REPORT 340461 R4 | DATE JUNE 1986 | DRAWING No NE.32

K J I H G F E D C B A

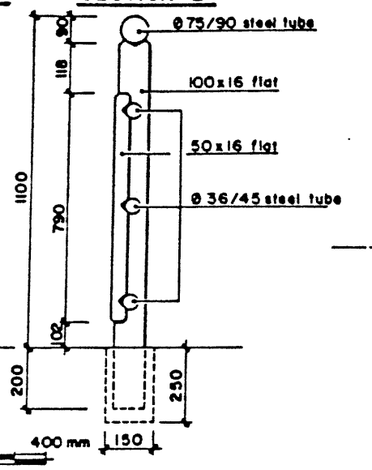
HEAVY DUTY RAILING



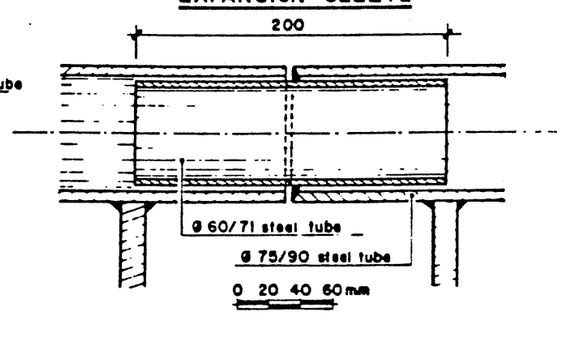
SECTION A



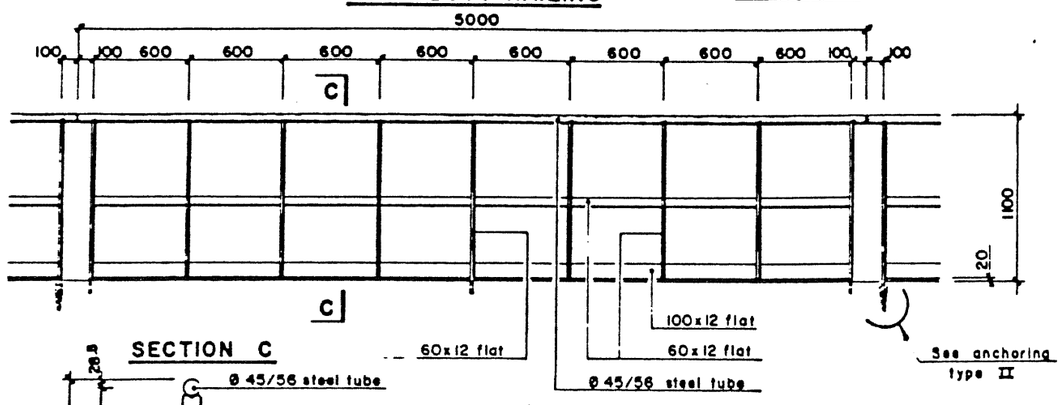
SECTION B



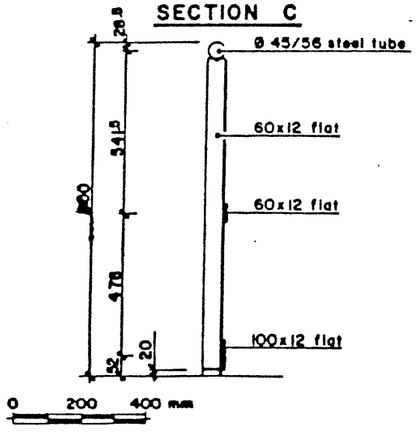
EXPANSION SLEEVE



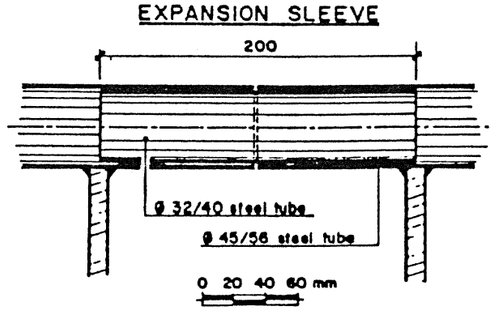
LIGHT DUTY RAILING



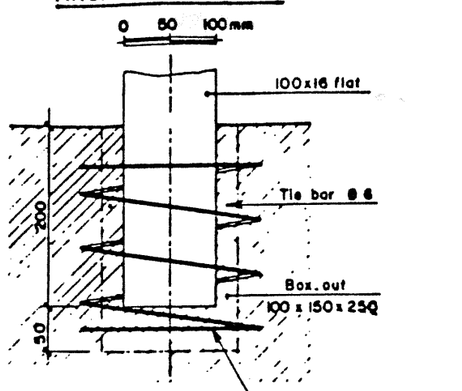
SECTION C



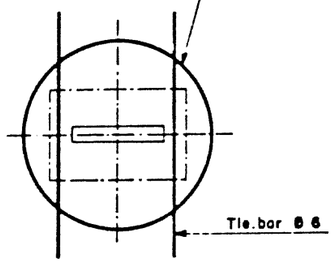
EXPANSION SLEEVE



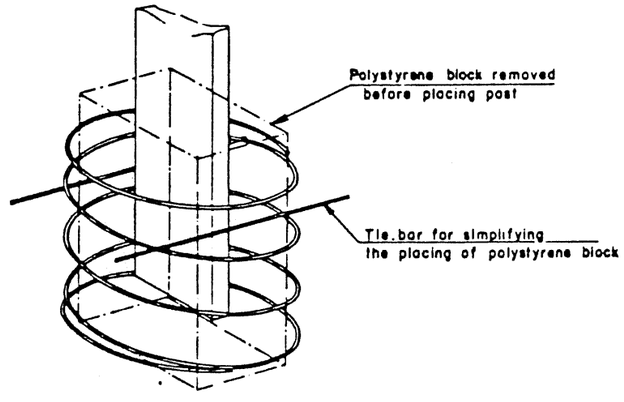
ANCHORING TYPE I



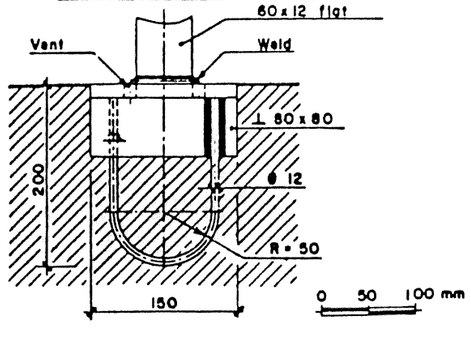
PLAN VIEW



ANCHORING PERSPECTIVE VIEW



ANCHORING TYPE II



ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

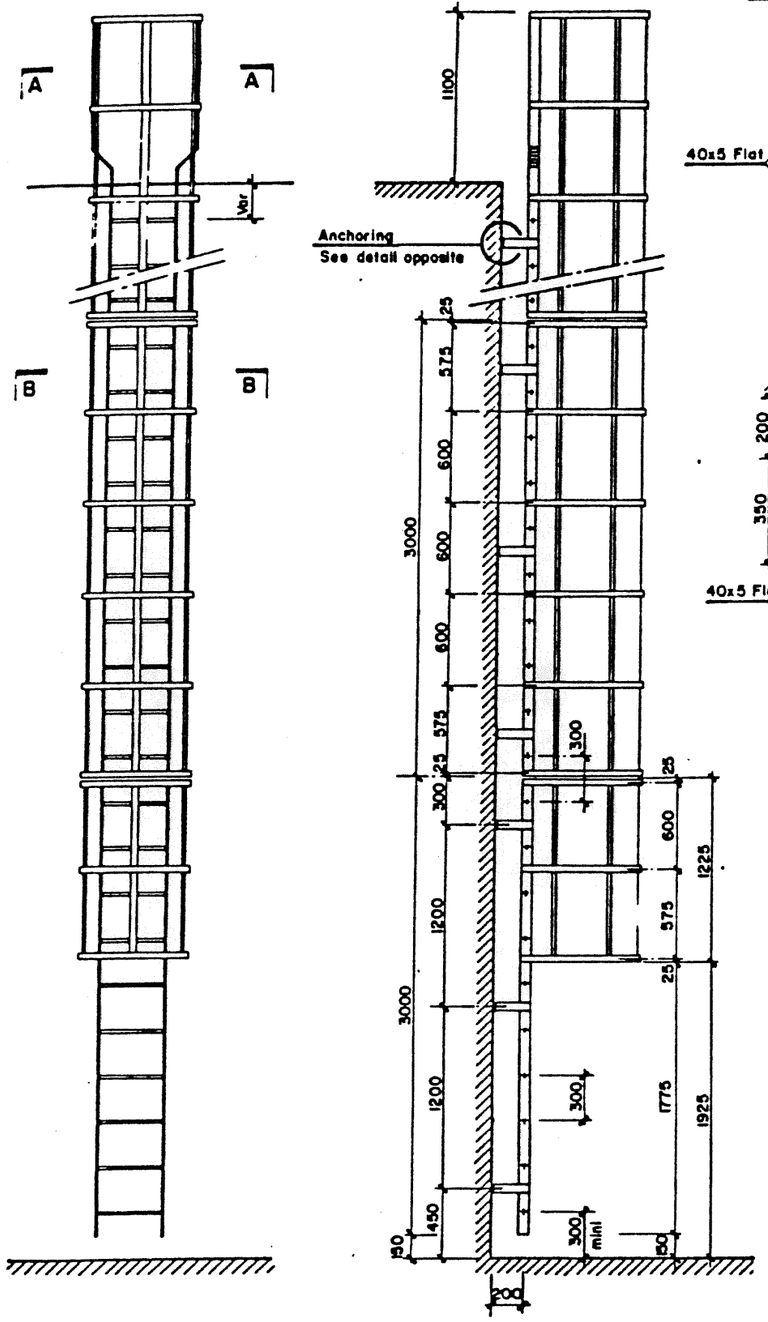
METALLIC EQUIPMENT

Railings

SOGREAH Ingénieurs Conseils Grenoble France	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DWG No NE.33

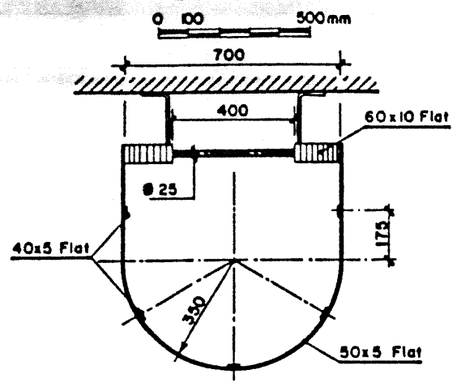
SAFETY LADDER

0 200 600 mm



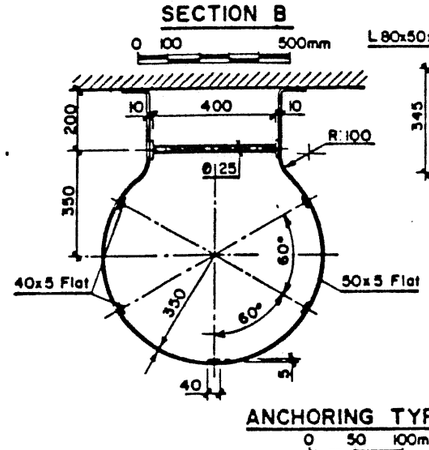
SECTION A

0 100 500mm



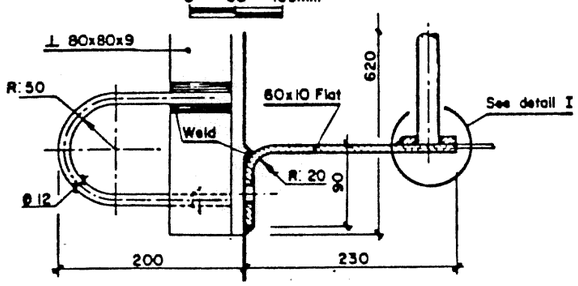
SECTION B

0 100 500mm



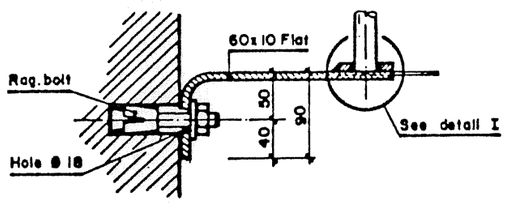
ANCHORING TYPE I

0 50 100mm



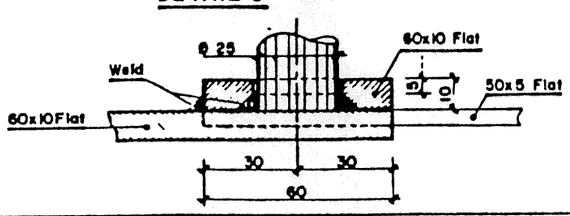
ANCHORING TYPE II

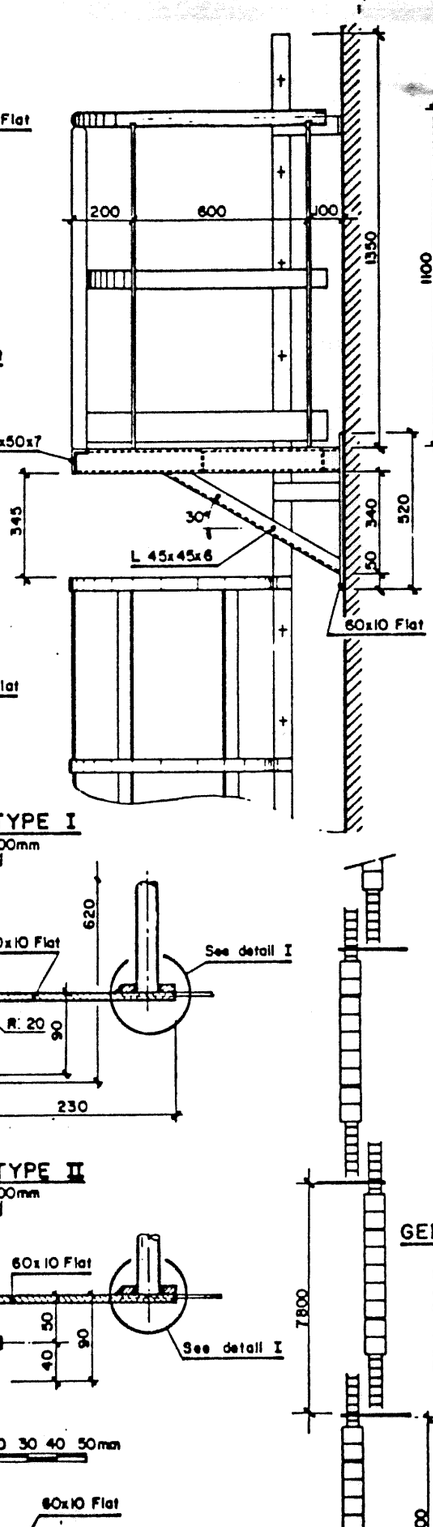
0 50 100mm



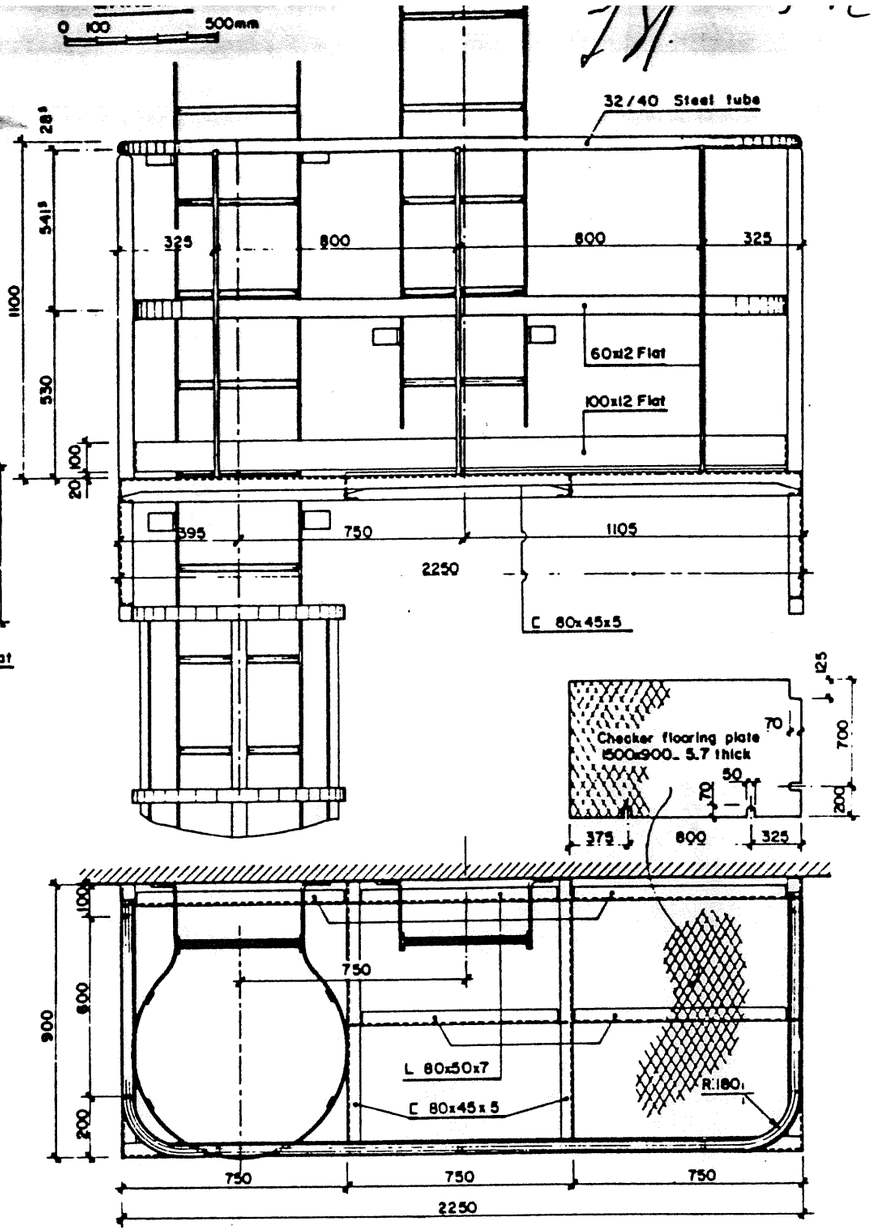
DETAIL I

0 10 20 30 40 50mm





0 100 500mm



GENERAL ARRANGEMENT

Nota: When level difference is greater than 3m the access ladder must be provided with a safety cage

When level difference is greater than 10m intermediate landings shall be provided at 7.80m vertical intervals

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

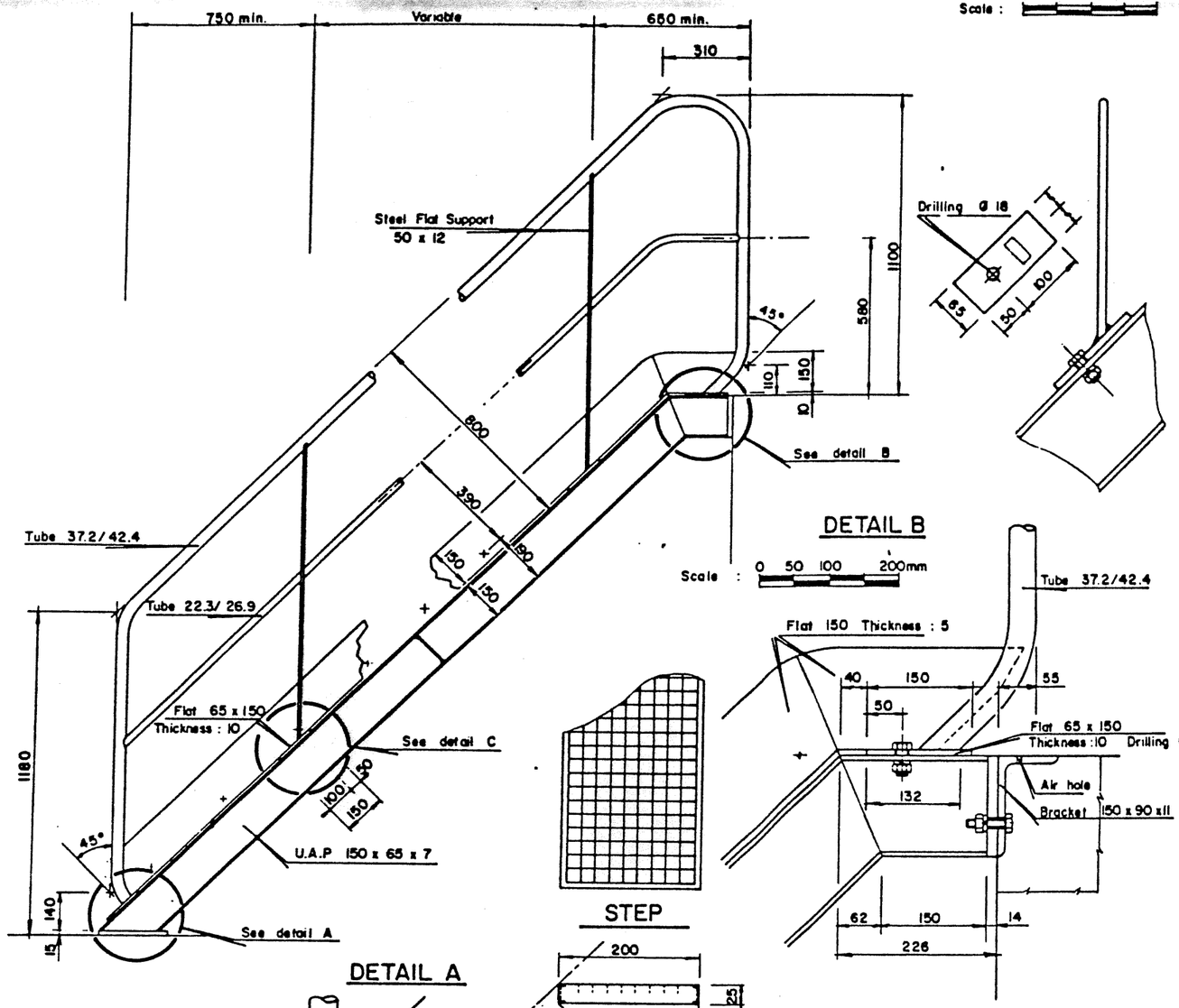
METALLIC EQUIPMENT

Ladders

SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED	REPORT 340461 R4	BWS No.
		DATE JUNE 1986	NE. 34

Transferred B.Rs' Oct. 78.

ELEVATION



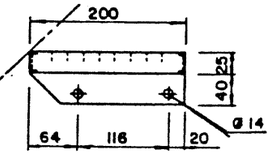
DETAIL C

Scale : 0 50 100 200mm

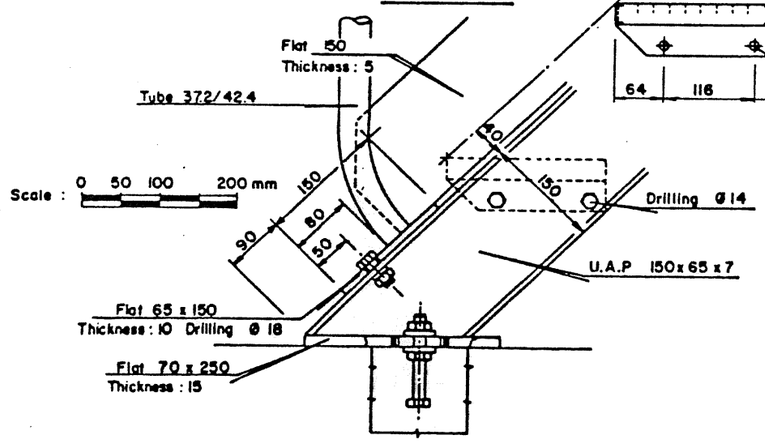
DETAIL B

Scale : 0 50 100 200mm

STEP

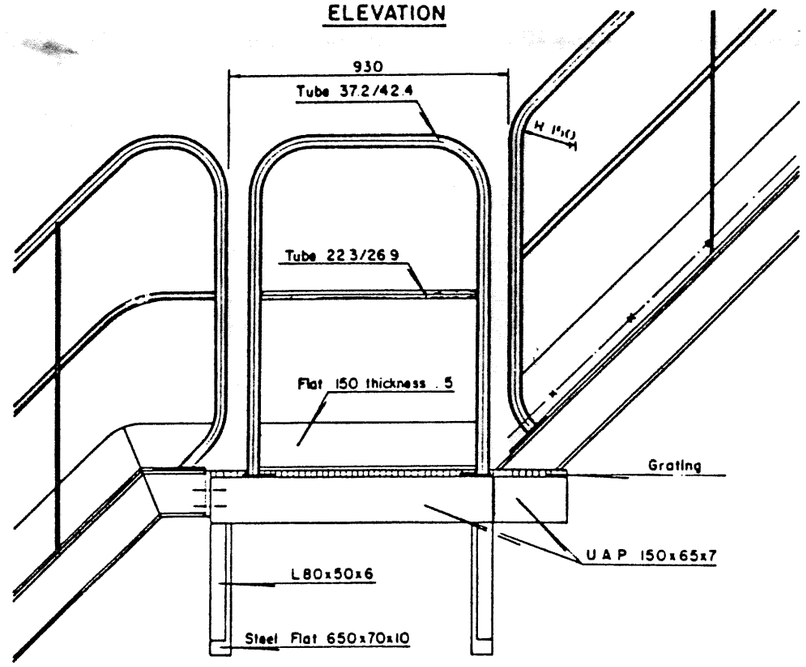


DETAIL A

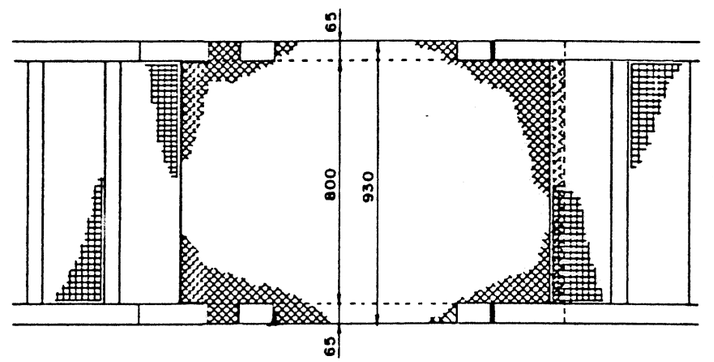


TRANSITION STAIRWAY-LANDING

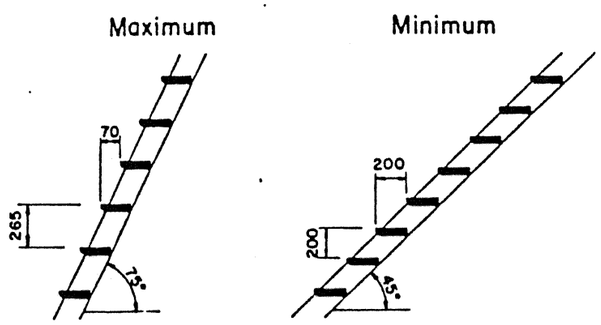
ELEVATION



PLAN VIEW



STAIRWAY INCLINATION



SCALE 0 200 500 mm

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

METALLIC EQUIPMENT

Stairs

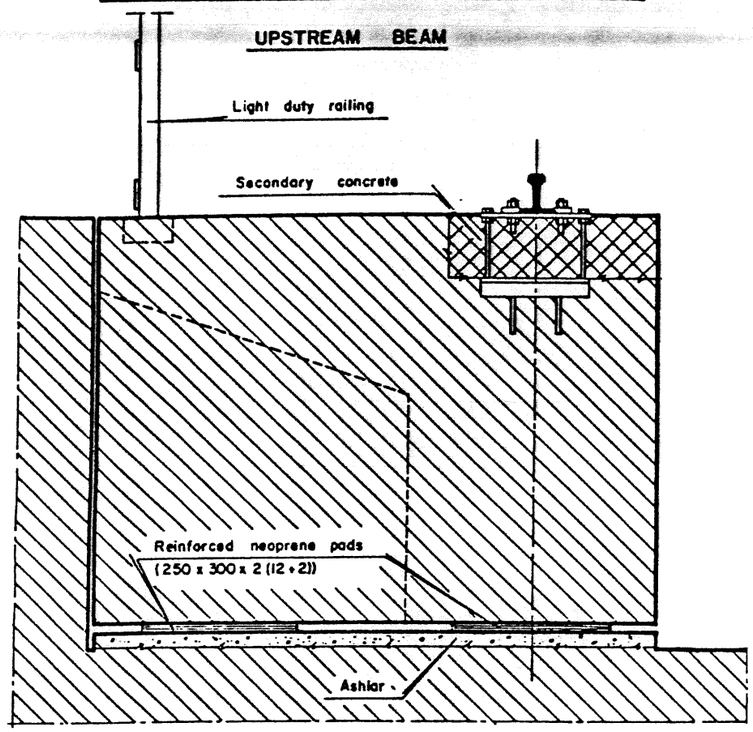
SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DRAWING No NE 35

SPILLWAY

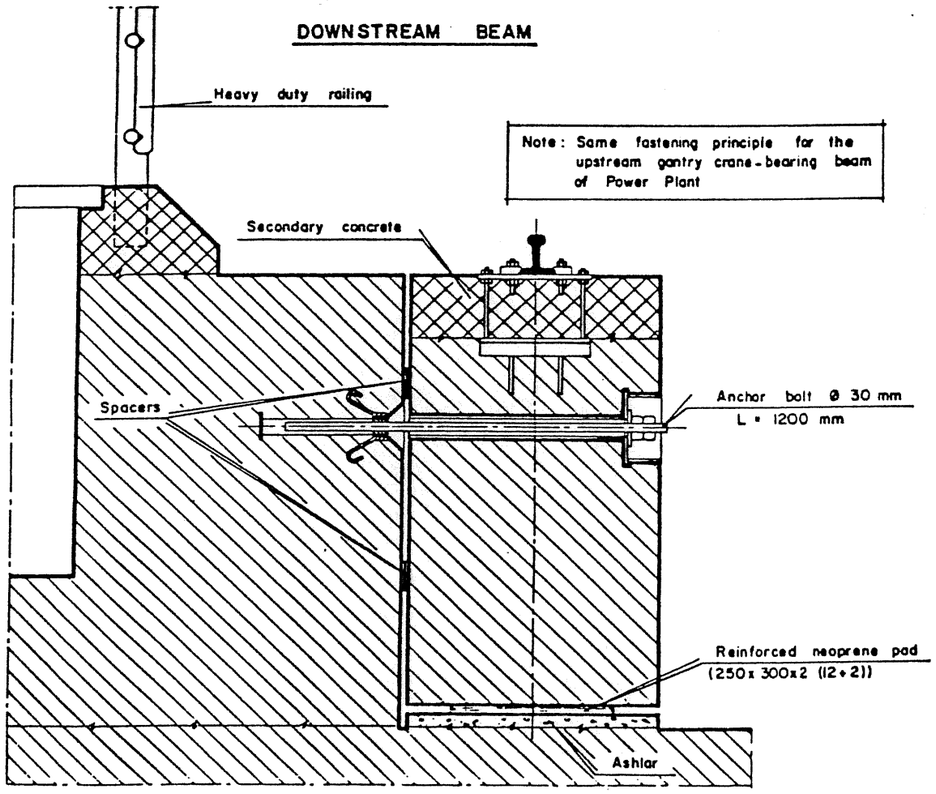
GANTRY CRANE - BEARING BEAMS

0 .10 .20 .30 .40 .50 m

UPSTREAM BEAM



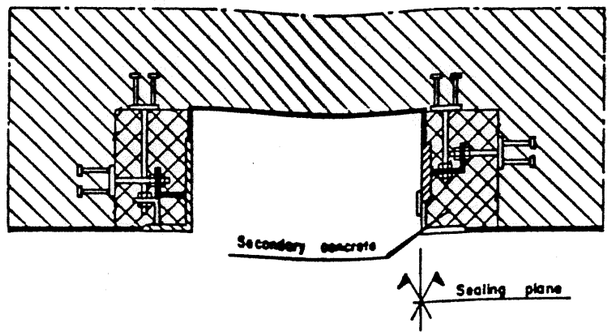
DOWNSTREAM BEAM



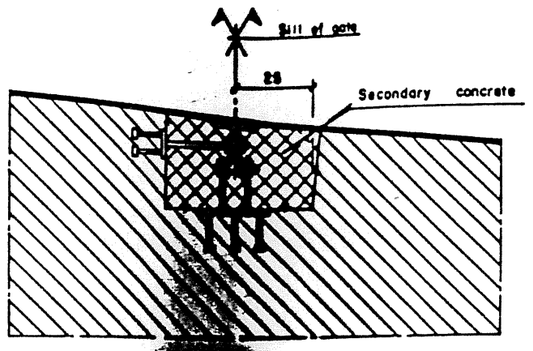
Note: Same fastening principle for the upstream gantry crane - bearing beam of Power Plant

BUILT IN PART EXAMPLES

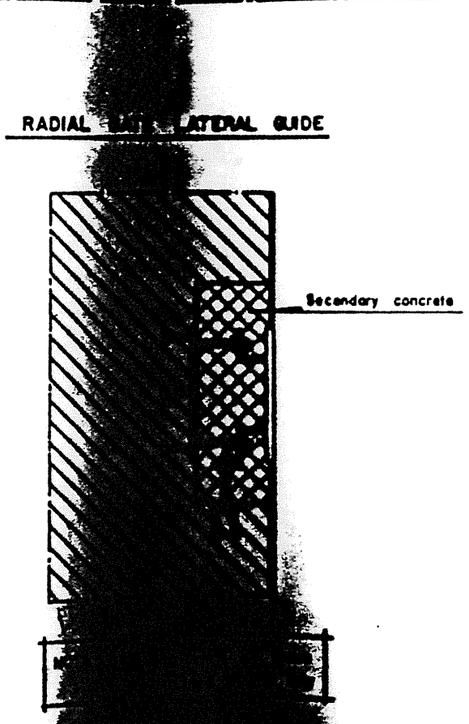
STOPLOG GROOVE



RADIAL GATE SILL



RADIAL GATE LATERAL GUIDE

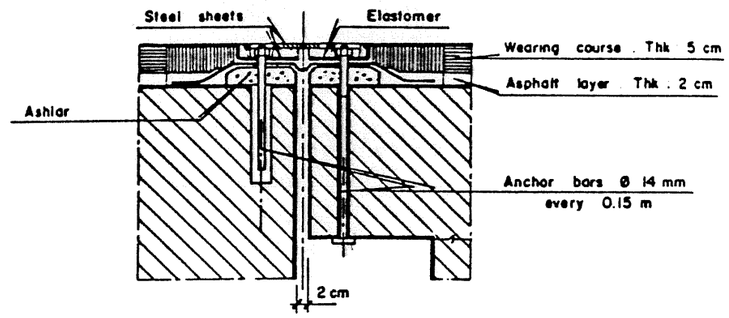


BRIDGE

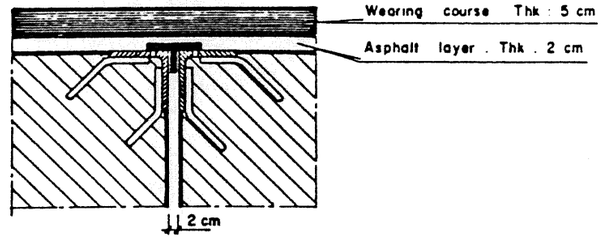
DETAILS OF EXPANSION JOINTS AND BEARINGS

0 5 10 15 20 25 cm

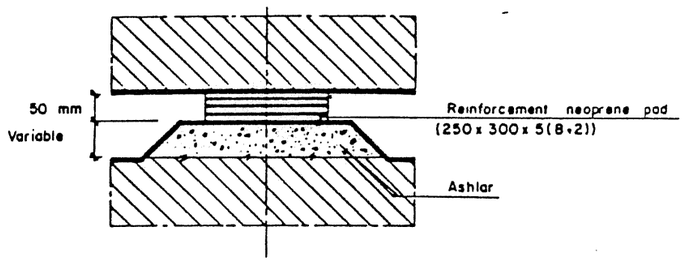
EXPANSION JOINT SYSTEM - HEAVY TYPE



EXPANSION JOINT SYSTEM - LIGHT TYPE



REINFORCED NEOPRENE BEARING PAD



ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND
GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

MISCELLANEOUS DETAILS

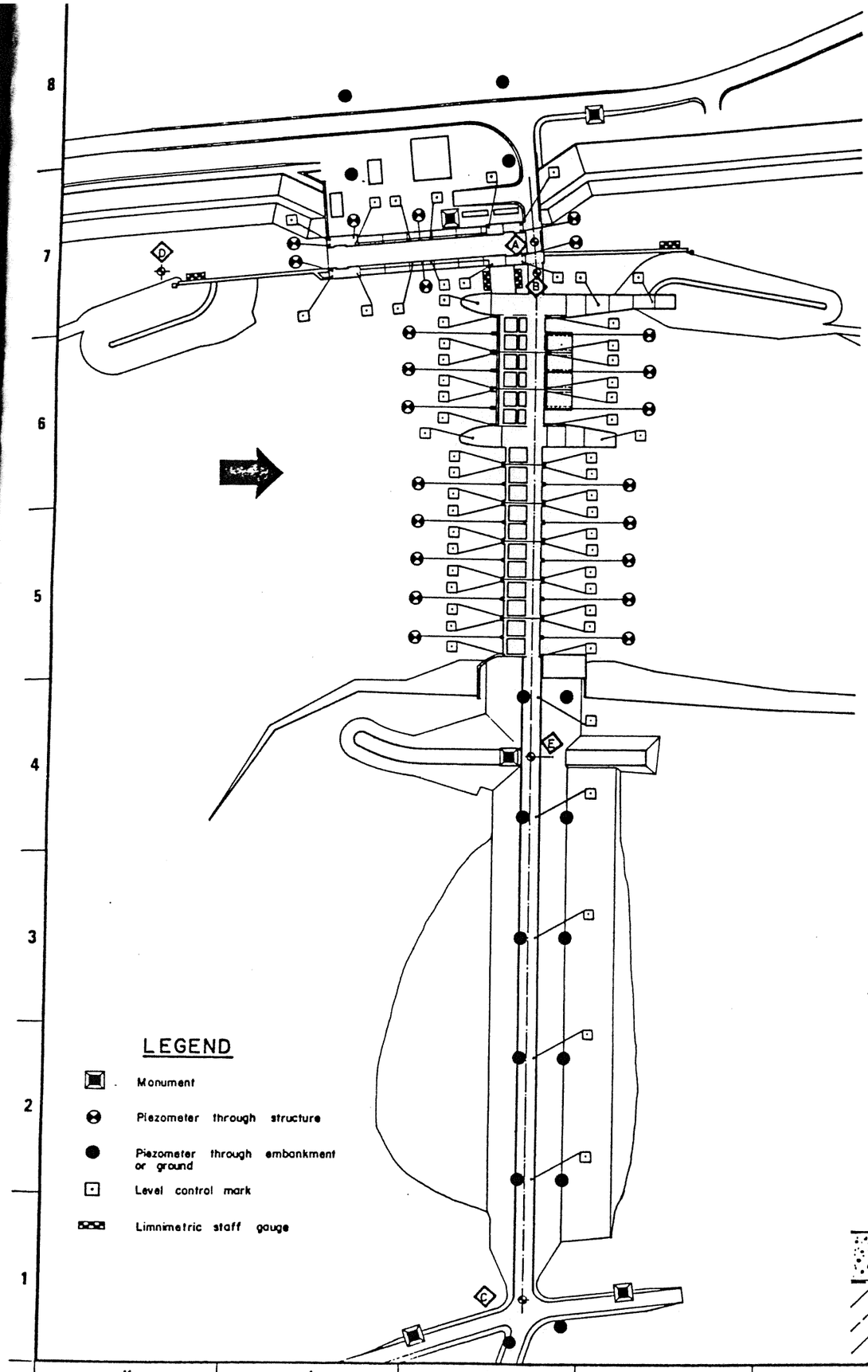
SOGREAH Ingénieurs Conseils
GRENOBLE - FRANCE

APPROVED

REPORT 340461 R4

DATE JUNE 1986

DRAWING No
NE.36

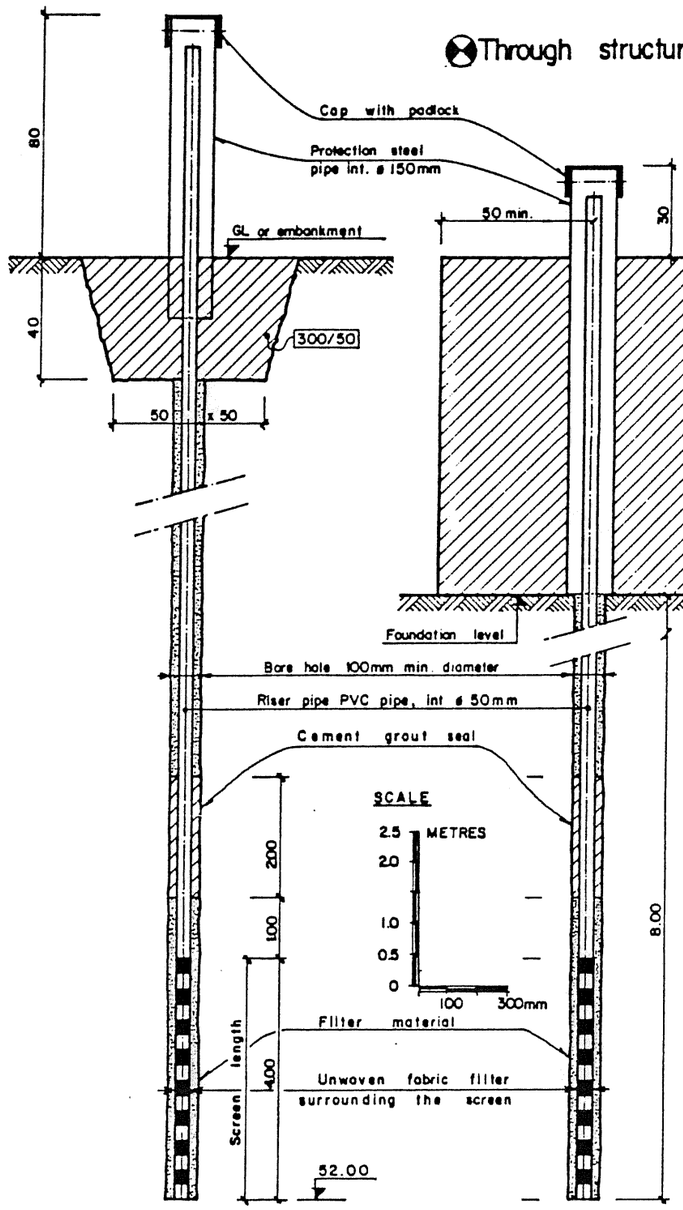


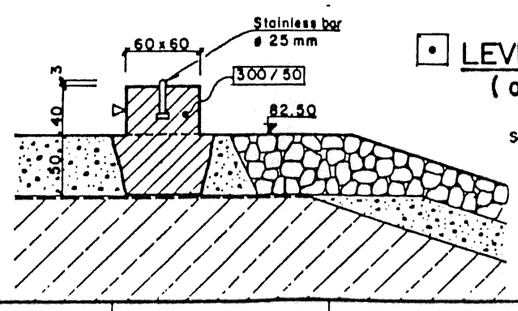
PIEZOMETER

SCALE 0 10 20 40 50 CM

Through embankment or ground

Through structure



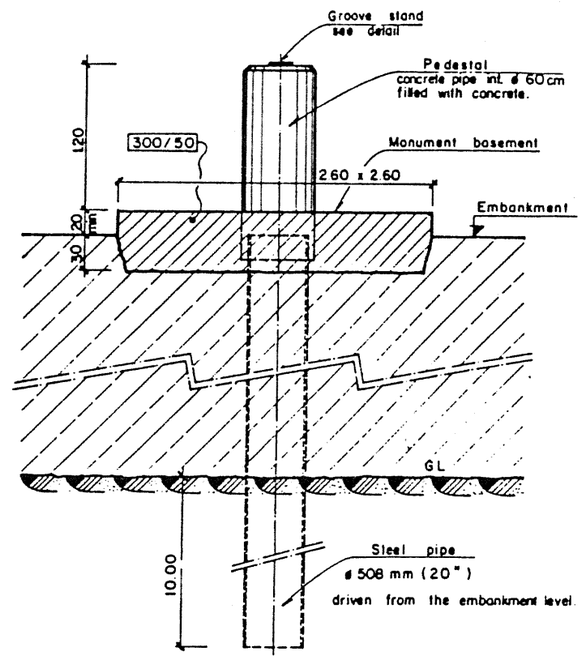


LEVEL CONTROL MARK
(on closure dam)

SCALE 0 0.25 0.5 1 1.25 METRES

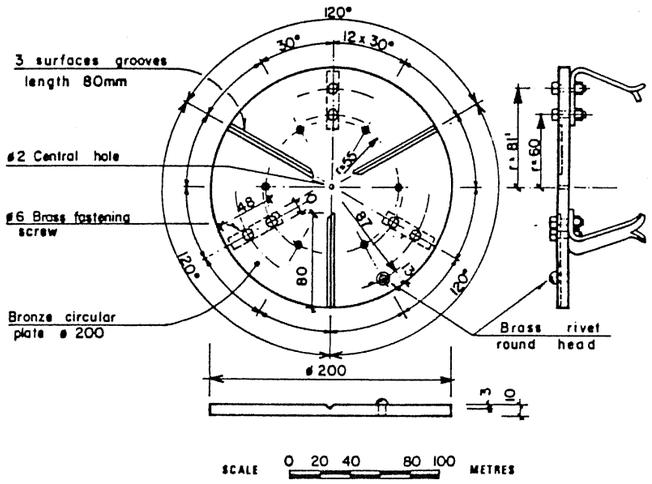
MONUMENT

SCALE 0 0.25 0.5 1 1.25 METRES



GROOVE STAND DETAIL

All dimensions are given in mm



SCALE 0 20 40 80 100 METRES

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

MONITORING EQUIPMENT

SOGREAH Ingénieurs Conseils GRENOBLE . FRANCE

APPROVED

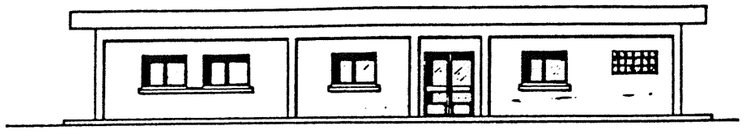
REPORT 340461 R4

DATE JUNE 1986

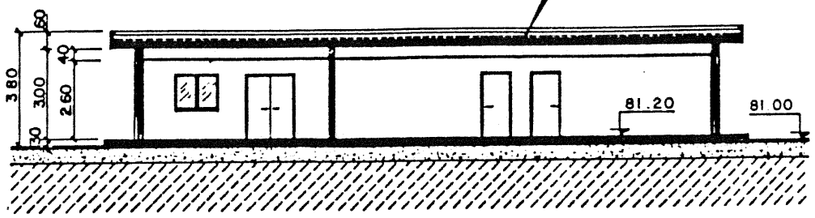
DRAWING No. NE 37

ADMINISTRATION BUILDING

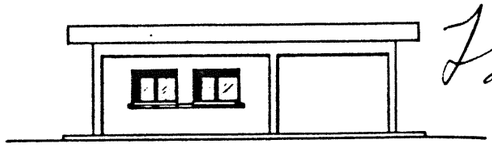
FRONT ELEVATION



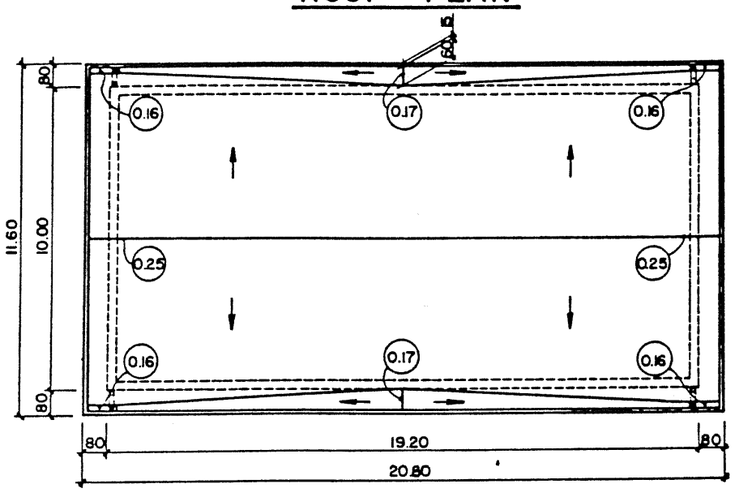
SECTION . A



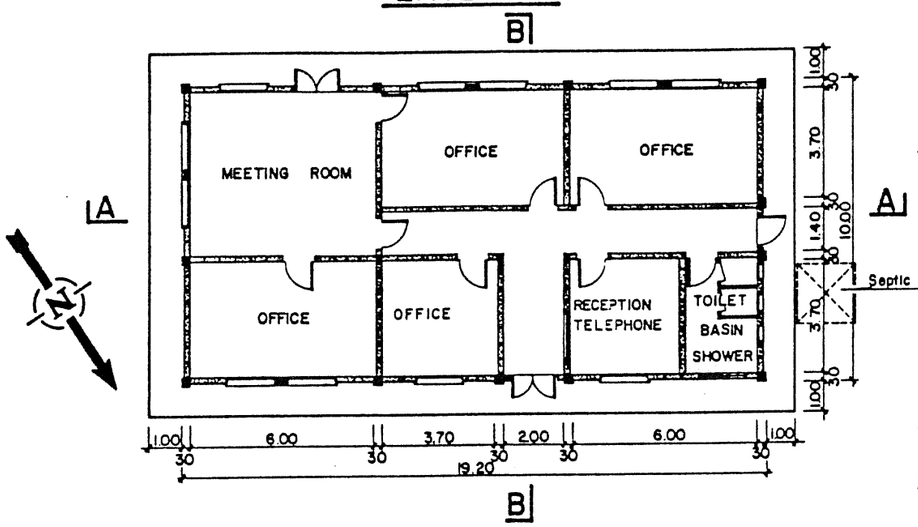
LEFT SIDE ELEVATION



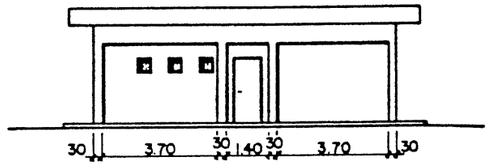
ROOF PLAN



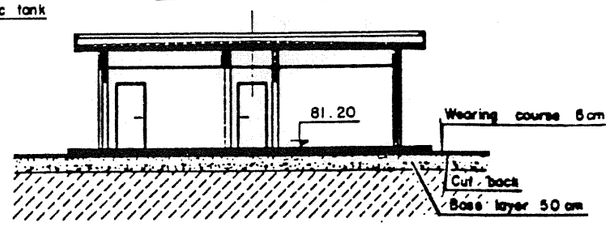
LAY_OUT



RIGHT SIDE ELEVATION

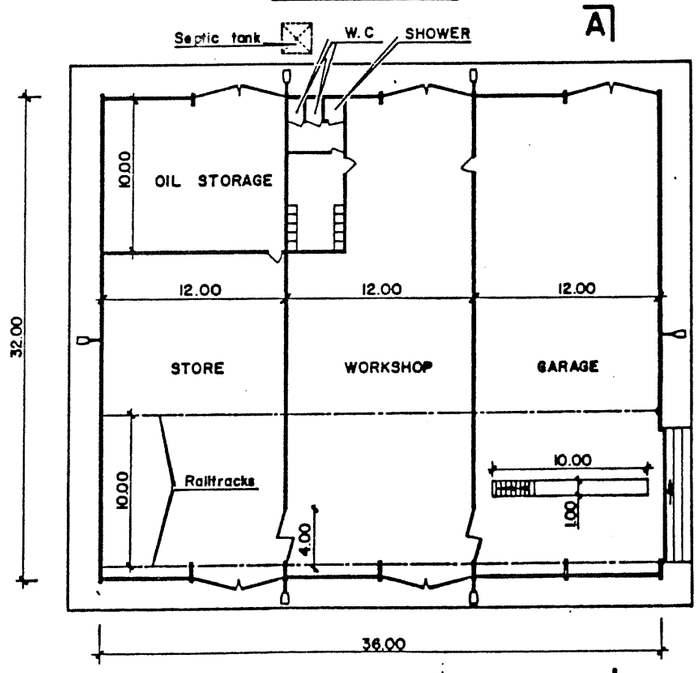


SECTION . B



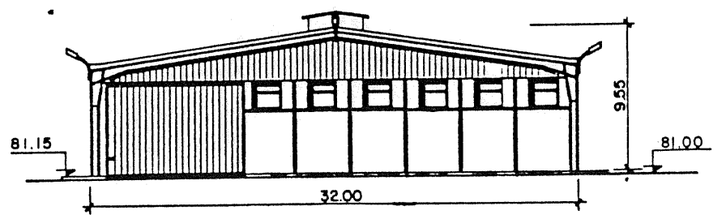
STORE HOUSE AND WORKSHOP

LAY_OUT

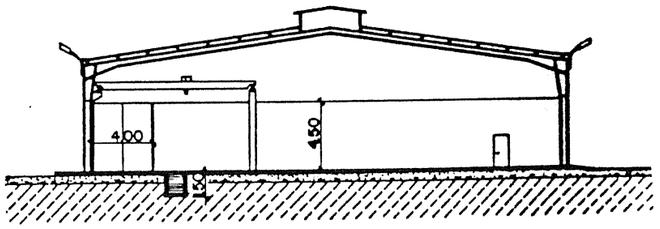


SCALE 0 2 4 6 8 10 METRES

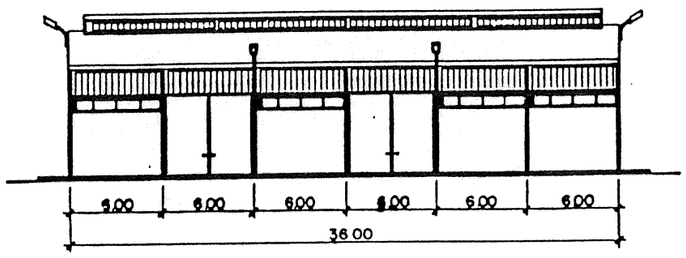
SIDE ELEVATION



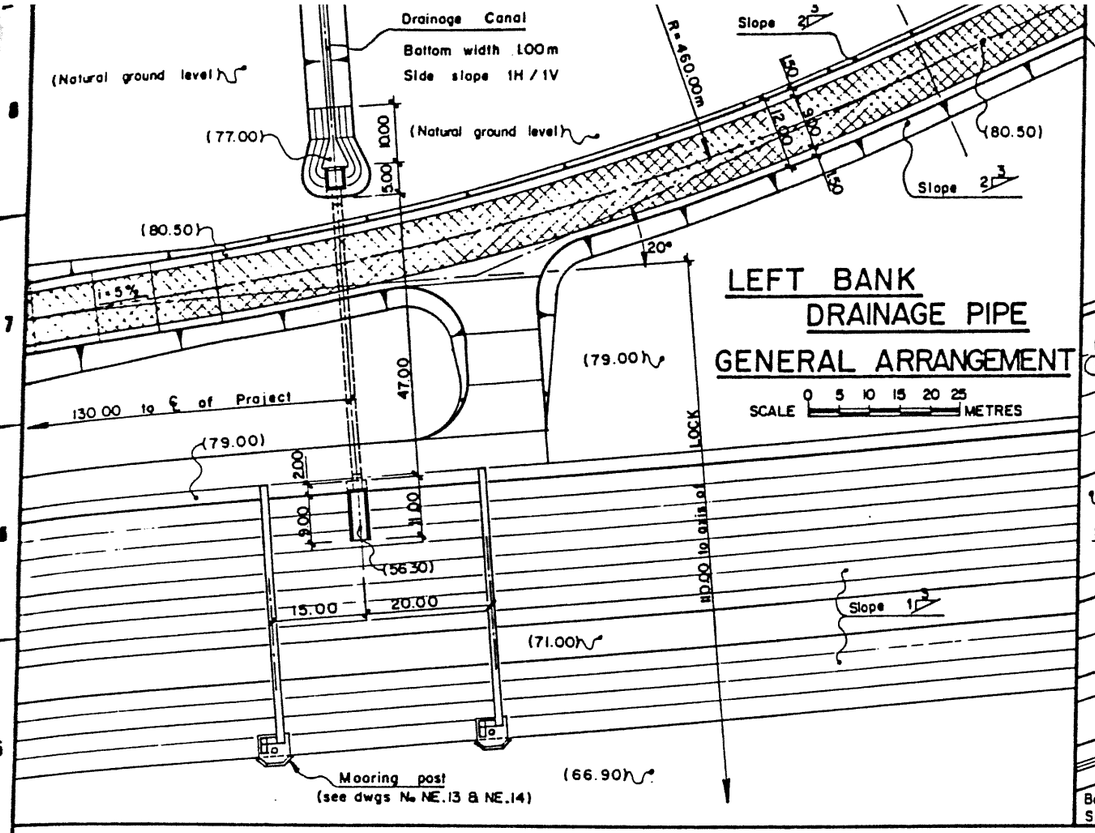
SECTION . A

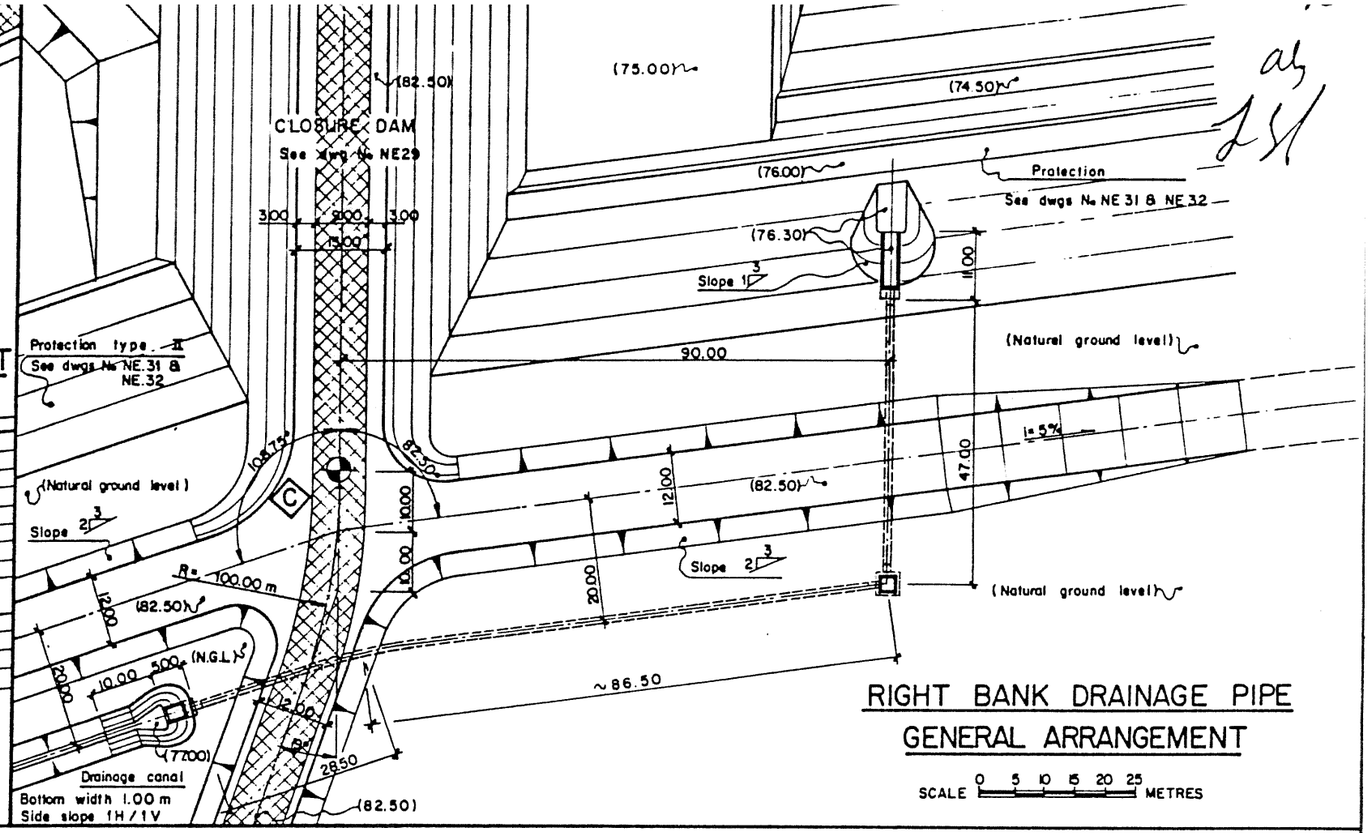


FRONT ELEVATION



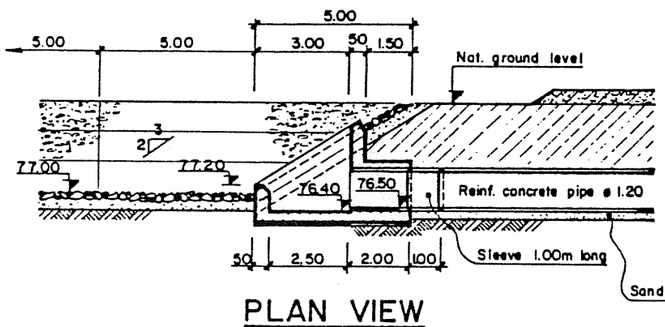
ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS
ADMINISTRATION BUILDING STORE HOUSE AND WORKSHOP	
SOGREAH Ingénieurs Conseils GRENOBLE FRANCE — APPROVED — REPORT 340461 R4 — DATE JUNE 1986	DWG. No. NE.38



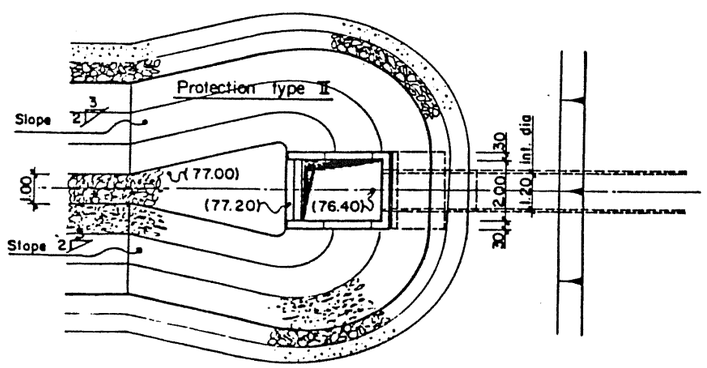


DRAINAGE PIPES INLET

SECTION A



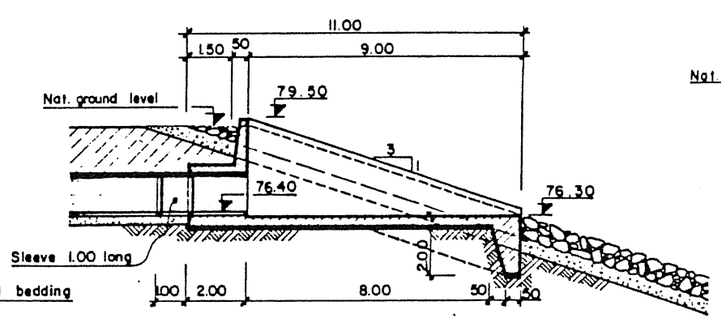
PLAN VIEW



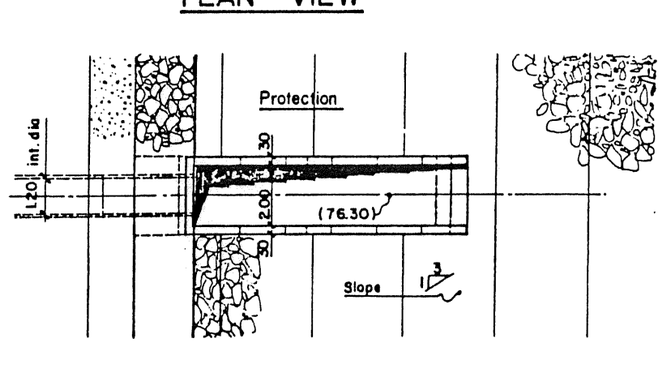
SCALE 0 1 2 3 4 5 METRES

DRAINAGE PIPES OUTLET

SECTION A

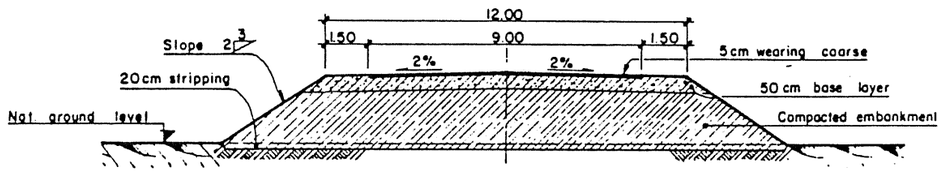


PLAN VIEW

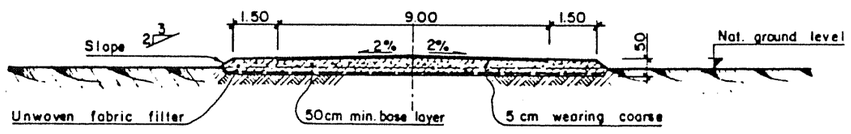


ROADWAY

TYPICAL CROSS SECTION IN FILL

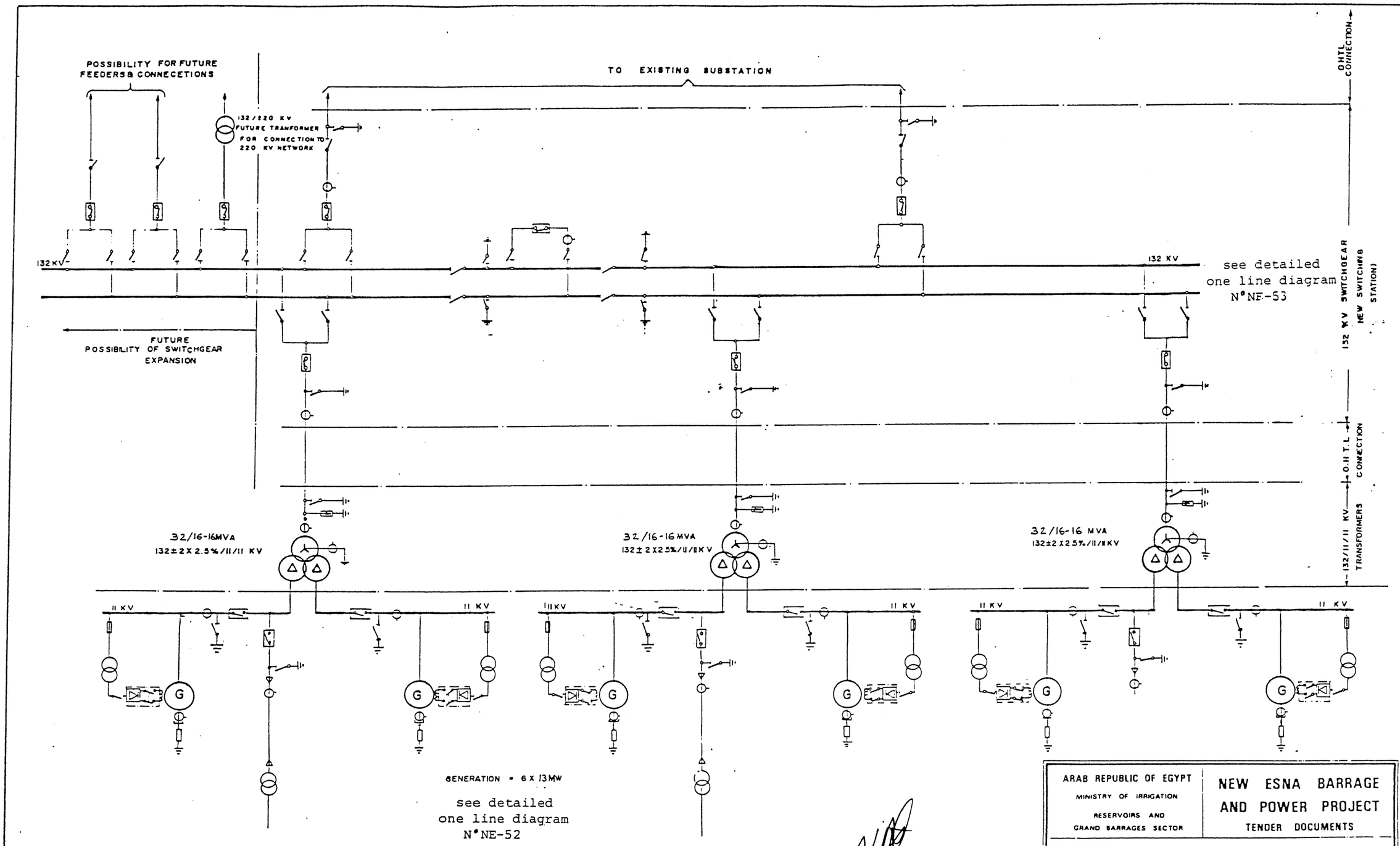


TYPICAL CROSS SECTION IN CUT & FILL



SCALE 0 1 2 4 5 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS		
ROADS AND DRAINAGE			
SOGREAH Ingénieurs Conseils GRENOBLE - FRANCE	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DRAWING No NE 39



ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

POWER PLANT AND SWITCHGEAR GENERAL ONE LINE DIAGRAM

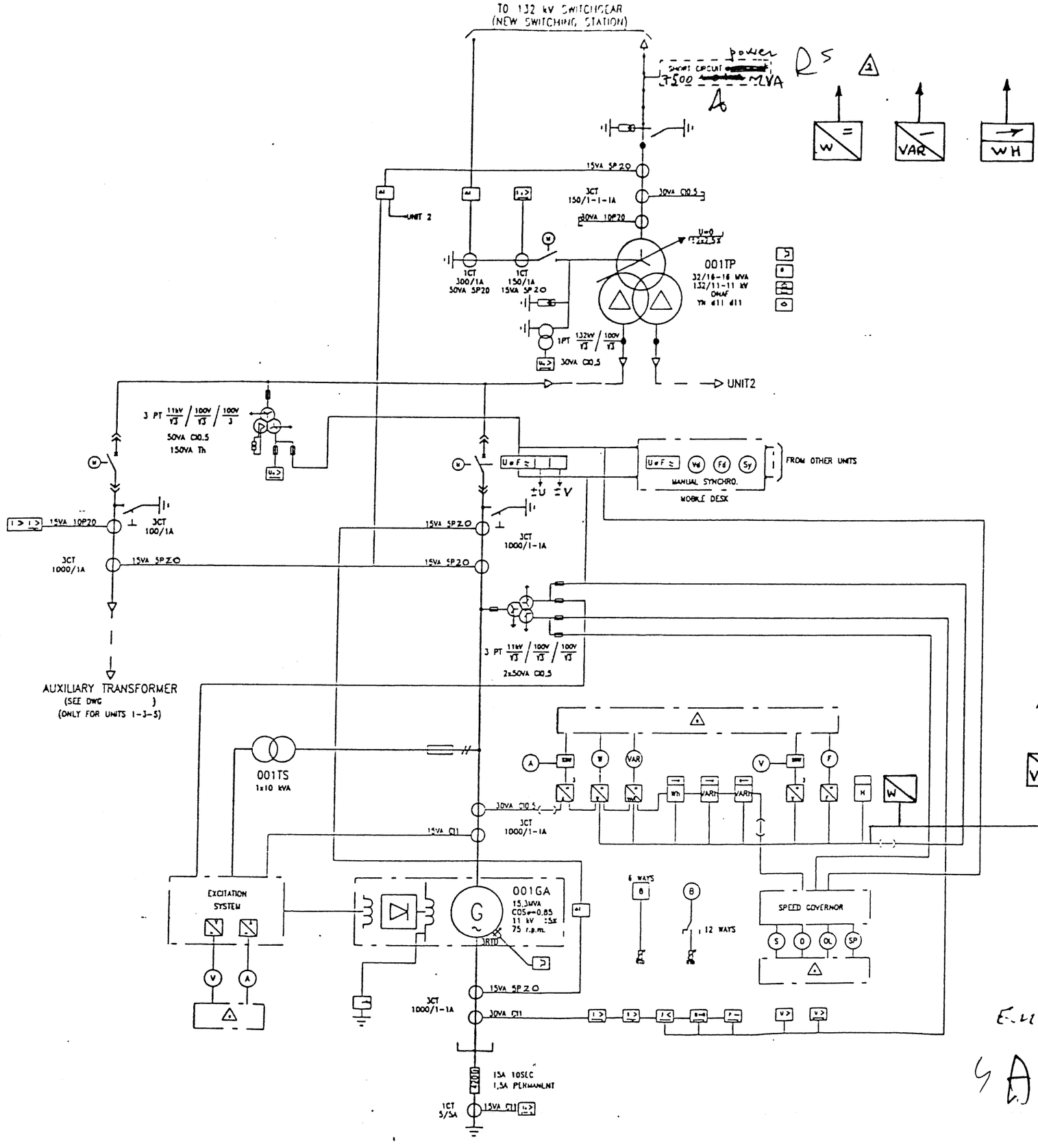
SOGREAH Ingenieurs Conseils GRENOBLE FRANCE

APPROVED

REPORT 340461 R4

DATE JUNE 1986

DRAWING No. NE.51



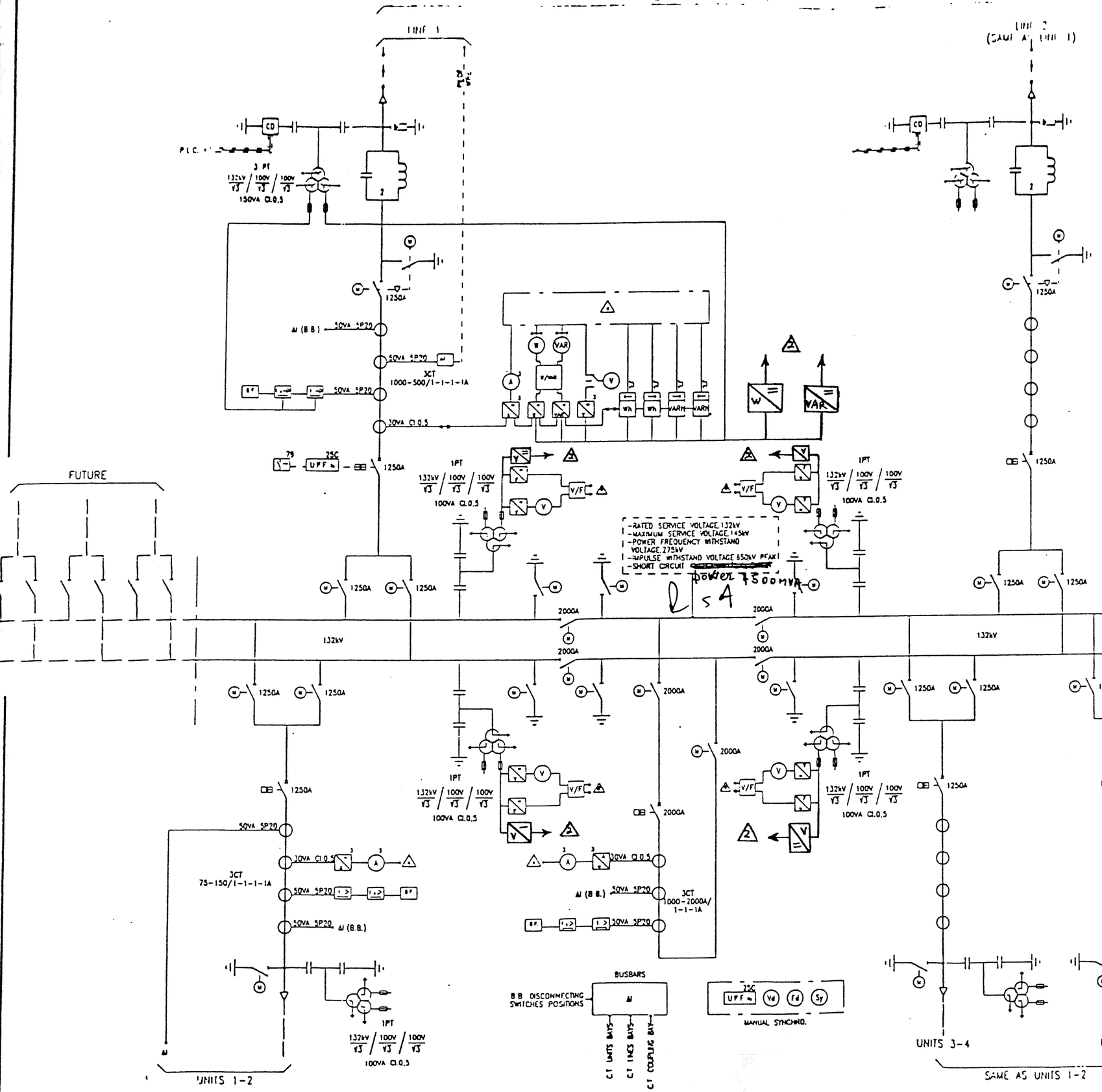
SWITCH	INDICATING INSTRUMENT	CONVERTER OR MEASURING TRANSDUCER		GUIDED WAVE BUS DUCT	
DISCONNECTING SWITCH	RECORDING INSTRUMENT	RECTIFIER EQUIPMENT		CABLE	
CIRCUIT BREAKER	INTEGRATING METER	PLUG AND SOCKET		OVERHEAD LINE	
CONTACTOR	MEASURING RELAY OR RELATED DEVICE	MOTOR OPERATED		CARRIER LINE TRAP	
FUSE	SIGNAL LAMP	LINE		POWER LINE CARRIER COUPLING DEVICE	
THERMAL ELEMENT MAGNETIC ELEMENT	INCANDESCENT LAMP	INVERTER			
COMMUTATOR	NEON LAMP	EARTH MASS			
ROTATING MACHINE	SPARK GAP	PULSE			
TWO WINDINGS TRANSFORMER	LIGHTNING ARRESTER	MECHANICAL INTERLOCK			
THREE WINDINGS TRANSFORMER	RESISTOR	MANUALLY OPERATED			
AUTO-TRANSFORMER	VARIABLE RESISTOR (R.T.D.)	INTERLOCK	FREE / IMPOSED		
CURRENT TRANSFORMER	CAPACITOR	PNEUMATIC OR HYDRAULIC CONTROL			
RESIDUAL CURRENT TRANSFORMER	INDUCTOR				
SHUNT	BATTERY				

ANSI	DESIGNATION	CEI	ANSI	DESIGNATION	CEI
12	OVERSPEED DEVICE	V >	50-76	INSTAN. A.C.-D.C. OVERCURRENT RELAY	I >
13	SYNCHRONOUS-SPEED DEVICE	V	51	TIME-LAG OVERCURRENT RELAY	I >
14	UNDERSPEED DEVICE	V <	51	REVERSE TIME OVERCURRENT RELAY	I >
15	SPEED MATCHING DEVICE	V ≈	51N	NEUTRAL TIME-LAG OVERCURRENT RELAY	I >
21	DISTANCE RELAY (IMPEDANCE)	Z	51V	OVERCURRENT WITH VOLTAGE RESTRAINT	I >/U <
21	DISTANCE RELAY (REACTANCE)	X	53	EXCITATION INCREASE RELAY	B >
21	DISTANCE RELAY (RESISTANCE)	Y	55	POWER FACTOR RELAY	cos φ
23	TEMPERATURE CONTROL DEVICE	θ	56	EXCITATION RELAY	B
25	SYNCHRONIZER (VOLTAGE)	U ≈	59	OVERVOLTAGE RELAY	U >
25	SYNCHRONIZER (PHASE ANGLE)	φ ≈	59N	NEUTRAL OVERVOLTAGE RELAY	U₀ >
25	SYNCHRONIZER (FREQUENCY)	f ≈	60	VOLTAGE BALANCE RELAY	U≠
26	THERMOMETER DETECTOR	θ	60	CURRENT BALANCE RELAY	I≠
27	UNDERVOLTAGE RELAY	U <	63	PRESSURE SWITCH	P
27	NO-VOLTAGE RELAY	U=0	64	MASS PROTECTION RELAY	
30	ANNUNCIATOR RELAY	●	67	DIRECTIONAL OVERCURRENT RELAY	I
32	DIRECT. ACTIVE POWER RELAY	P →	67N	DIRECT. NEUTRAL OVERCURRENT RELAY	I₀
32	DIRECT. REACTIVE POWER RELAY	Q →	74	ALARM RELAY	
32	REVERSE ACTIVE POWER RELAY	P ←	78	MEASURING RELAY AND PHASE-RELAY PROTECTION	φ
32	REVERSE REACTIVE POWER RELAY	Q ←			
37	UNDERCURRENT RELAY	I <	79	AUTO-RECLOSING RELAY	
37	UNDER POWER RELAY	P <	81	FREQUENCY RELAY	
38	MECHANICAL CONDITION MONITOR		87	DIFFERENTIAL PROTECTIVE RELAY	Δ I
40	EXCITATION FAULT RELAY	R <	87N	GROUND DIFFERENTIAL PROTECTIVE RELAY	Δ I
40	NO-EXCITATION RELAY	R=0	95	BUCHHOLZ RELAY	
46	PHASE-BALANCE OR REVERSE-PHASE CURRENT RELAY	I >			
47	VOLTAGE RELAY	U	V/Hz	OVERFLUXING RELAY	V/f >
49	THERMAL RELAY	θ			
49	THERMOSTAT	θ			

(S) SPEED
(O) OPENING
(OL) OPENING LIMITOR
(SP) SPEED POWER SETTING
△ CONTROL ROOM COMPUTER SYSTEM

△2 To Remote terminal Unit (RTU)
(RTU Provided by Contractor)

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS
POWER PLANT ONE LINE DIAGRAM	
SOGREAH Ingénieurs Conseils GRENOBLE FRANCE	APPROVED DATE 20/10/88 REPORT 340461 R4 DRAWING No NE.52



	SWITCH		OPERATING INSTRUMENT		TRANSMITTER FOR MEASURING TRANSDUCE
	DISCONNECTING SWITCH		RECORDING INSTRUMENT		ENCRYPTION EQUIPMENT
	CIRCUIT BREAKER		INTEGRATING METER		PLUG AND SOCKET
	CONTACTOR		MEASURING RELAY OR RELATED DEVICE		MOTOR OPERATED
	FUSE		SIGNAL LAMP		LINE
	THERMAL ELEMENT MAGNETIC ELEMENT		FLUORESCENT LAMP		ENVELOPE
	COMMUTATOR		HEATER LAMP		EARTH MASS
	ROTATING MACHINE		SPARK GAP		PULSE
	TWO WINDINGS TRANSFORMER		LIGHTNING ARRESTER		MECHANICAL INTERLOCK
	THREE WINDINGS TRANSFORMER		RESISTOR		MANUALLY OPERATED
	AUTO-TRANSFORMER		VARIABLE RESISTOR (R T O)		INTERLOCK FREE WHEN CLOSED
	CURRENT TRANSFORMER		CAPACITOR		PNEUMATIC OR HYDRAULIC CONTROL
	RESIDUAL CURRENT TRANSFORMER		INDUCTOR		
	SHUNT		BATTERY		

ANSI	DESIGNATION	CD	ANSI	DESIGNATION	CE
12	OVERSPEED DEVICE	V >	50-76	INSTAN. A.C.-D.C. OVERCURRENT RELAY	I >
13	SYNCHRONOUS-SPEED DEVICE	V	51	TIME-LAG OVERCURRENT RELAY	
14	UNDERSPEED DEVICE	V <	51	REVERSE TIME OVERCURRENT RELAY	
15	SPEED MATCHING DEVICE	V ≈	51n	NEUTRAL TIME-LAG OVERCURRENT RELAY	
21	DISTANCE RELAY (IMPEDANCE)	Z	51V	OVERCURRENT WITH VOLTAGE RESTRAINT	I>/U<
21	DISTANCE RELAY (REACTANCE)	X	53	EXCITATION INCREASE RELAY	
21	DISTANCE RELAY (RESISTANCE)	Y	55	POWER FACTOR RELAY	cos φ
23	TEMPERATURE CONTROL DEVICE	θ	56	EXCITATION RELAY	
25	SYNCHRONIZER (VOLTAGE)	U ≈	59	OVERVOLTAGE RELAY	U>
25	SYNCHRONIZER (PHASE ANGLE)	φ ≈	59n	NEUTRAL OVERVOLTAGE RELAY	Un>
25	SYNCHRONIZER (FREQUENCY)	f ≈	60	VOLTAGE BALANCE RELAY	
26	THERMOMETER DETECTOR	θ	60	CURRENT BALANCE RELAY	
27	UNDERVOLTAGE RELAY	U <	63	PRESSURE SWITCH	
27	NO-VOLTAGE RELAY	U=0	64	MASS PROTECTION RELAY	
30	ANNUNCIATOR RELAY	●	67	DIRECTIONAL OVERCURRENT RELAY	
32	DIRECT. ACTIVE POWER RELAY	P →	67n	DIRECT. NEUTRAL OVERCURRENT RELAY	
32	DIRECT. REACTIVE POWER RELAY	Q →	74	ALARM RELAY	
32	REVERSE ACTIVE POWER RELAY	P ←	78	MEASURING RELAY AND PHASE-RELAY PROTECTION	φ
32	REVERSE REACTIVE POWER RELAY	Q ←			
37	UNDERCURRENT RELAY	I <	79	AUTO-RECLOSING RELAY	
37	UNDER POWER RELAY	P <	81	FREQUENCY RELAY	f
38	MECHANICAL CONDITION MONITOR	⊸○	87	DIFFERENTIAL PROTECTIVE RELAY	ΔI
40	EXCITATION FAULT RELAY	R <	87n	GROUND DIFFERENTIAL PROTECTIVE RELAY	ΔI
48	NO-EXCITATION RELAY	R=0	95	BUCHHOLZ RELAY	
46	PHASE-BALANCE OR REVERSE-PHASE CURRENT RELAY	I >			
47	VOLTAGE RELAY	U	V/Hz	OVERFLUXING RELAY	V/f >
48	THERMAL RELAY				
49	THERMOSTAT	θ			

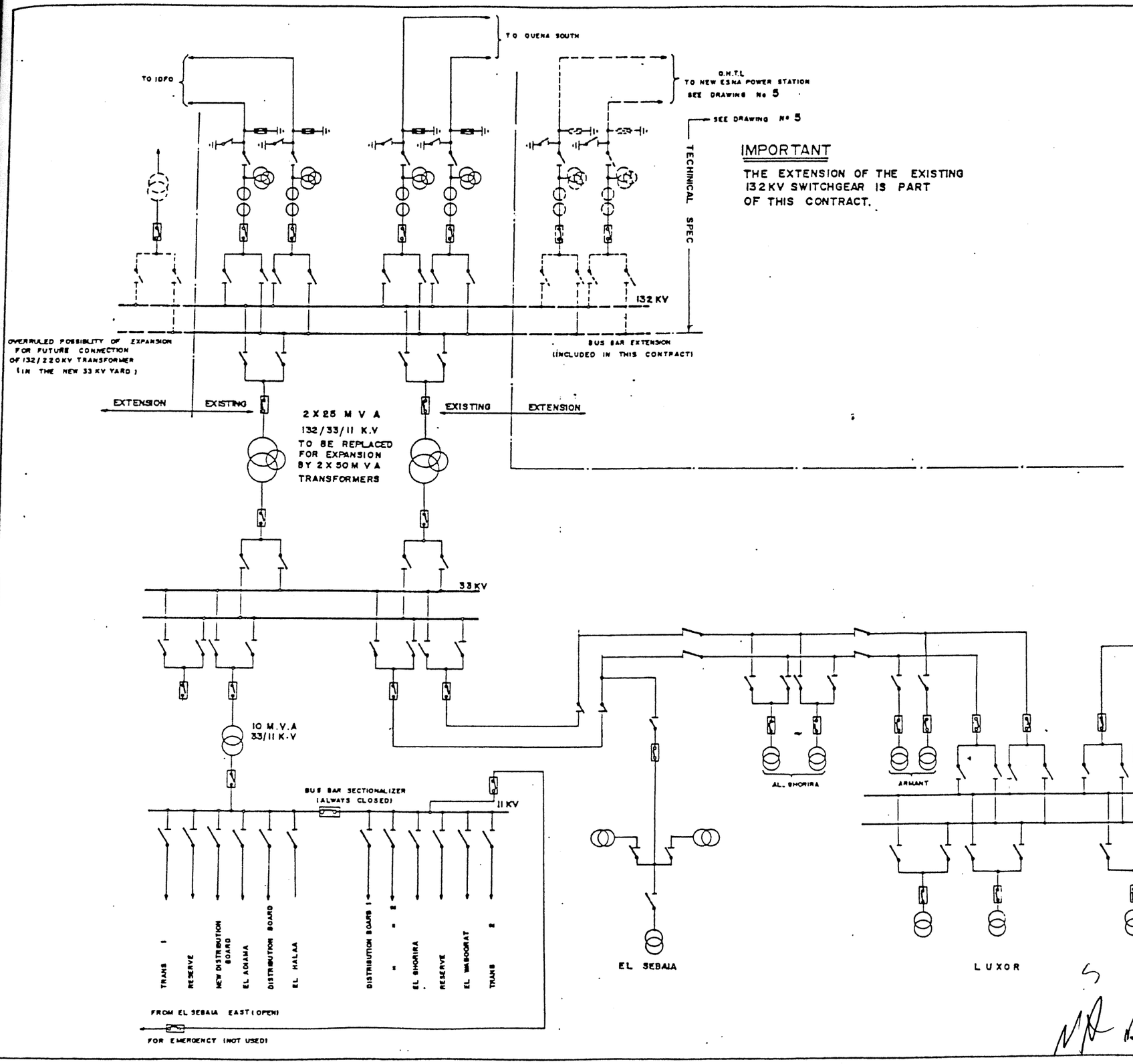
BF BREAKER FAILURE

△ CONTROL ROOM COMPUTER SYSTEM

△2 To Remote terminal unit (RTU)

For national Control Centre

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS	
132KV NEW ESNA SWITCHGEAR ONE LINE DIAGRAM		
SOGREAH Ingenieurs Conseils GRENOBLE - FRANCE	APPROVED	REPORT 340461 R1 DRAWING No DATE 20/10/81 NE.53



IMPORTANT

THE EXTENSION OF THE EXISTING 132 KV SWITCHGEAR IS PART OF THIS CONTRACT.

S EM A

M R A

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND
GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

EXTENTION OF EXISTING ESNA 132KV SWITCHGEAR ONE LINE DIAGRAM

SOGREAH Ingénieurs Conseils
GRENOBLE - FRANCE

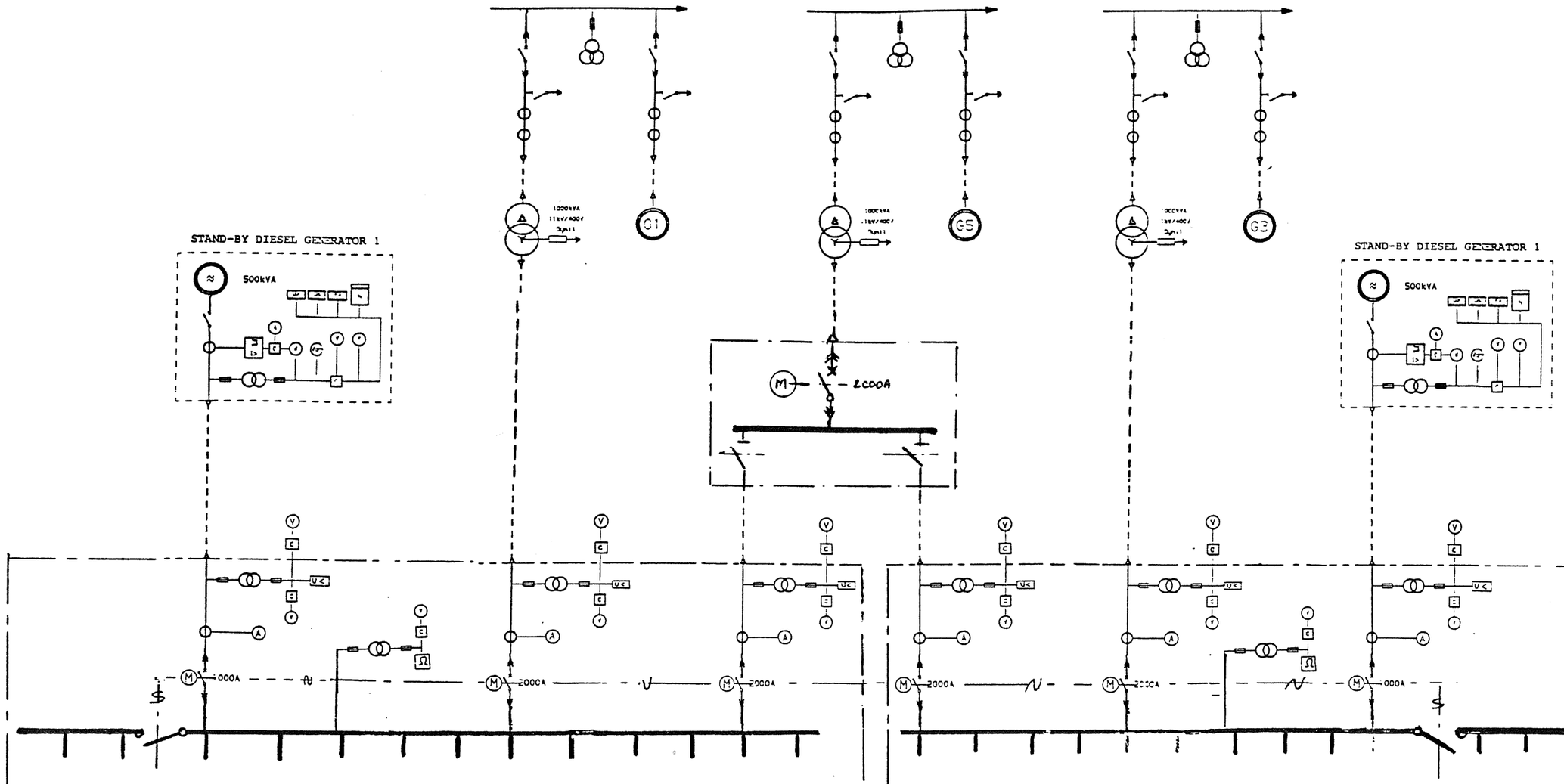
APPROVED

REPORT 34046I R4

DATE JUNE 1986

DRAWING No NE.54

= POWER PLANT =



ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS
AC LOW VOLTAGE DISTRIBUTION SYSTEM SHEET 1/2	
SOGREAH Ingenieurs Conseils GRENOBLE - FRANCE APPROVED	REPORT 340461 R4 DATE 20/10/88 DRAWING No. NE.55

MAIN DISTRIBUTION BOARD PART 1 (SEE SHEET 1/2)

ESSENTIAL AUXILIARIES

NON ESSENTIAL AUXILIARIES

MAIN DISTRIBUTION BOARD PART 2 (SEE SHEET 1/2)

ESSENTIAL AUXILIARIES

NON ESSENTIAL AUXILIARIES

UNIT 1 UNIT 2 UNIT 3

UNIT AUXILIARIES

UNIT 4 UNIT 5 UNIT 6

N.ES

POWER PLANT GENERAL AUXILIARIES

POWER PLANT GENERAL AUXILIARIES

SUBSTATION

DEWATERING 1

DEWATERING 2

DEWATERING 3

N.ES

ADMINISTRATIVE BUILDING

N.ES

WORKSHOP/STORE HOUSE

N.ES

LOCK AUX.

UPSTREAM HEAD

CONTROL TOWER

LOCK AUXILIARIES

DOWNSTREAM HEAD

N. ES ≙ NON ESSENTIAL

SPILLWAY GATE AUXILIARIES G1 G2 G3 G4 G5 G6 G7

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

AC LOW VOLTAGE DISTRIBUTION SYSTEM

SHEET 2/2

SOGREAH

GENERAL AUXILIARIES

(ESSENTIAL)

FIRE PROTECTION, SERVICE AND SANITARY PUMP	1KW
SHAFT SEAL WATER PUMP 1	2.5KW
SHAFT SEAL WATER PUMP 2	2.5KW
SHAFT SEAL WATER PUMP 3	2.5KW
AIR COMPRESSOR 1	18.5KW
AIR COMPRESSOR 2	18.5KW
REGULATION COMPRESSOR 1	20KW
REGULATION COMPRESSOR 2	20KW
SPARE	
SPARE	
SERVICE AUTOMATIC FILTER 100µ	1.1KW
SHAFT SEAL AUTOMATIC FILTER 100µ	1.1KW
POWER TRANSFORMER 1	6KW
POWER TRANSFORMER 2	6KW
POWER TRANSFORMER 3	6KW
BATTERY CHARGER 220V 1	20KW
BATTERY CHARGER 220V 2	20KW
CONTROL BATTERY CHARGER 48V 1	10KW
CONTROL BATTERY CHARGER 48V 2	10KW
TELECOM BATTERY CHARGER 48V	2KW
AC/DC CONVERTER	3KW
GENERAL SERVICES	10KW
DIESEL AUXILIARIES 1	5KW
DIESEL AUXILIARIES 2	5KW
SPARE	
SPARE	

from the main switchboard

Cooling water pump 1 for air cond. 3KW
Cooling water pump 2 for air cond. 3KW
SPARE
Cooling water treatment automatic filter 100 KW
5 KW
FREIGHT ELEVATOR 10 KW
PASSENGER ELEVATOR 10 KW
OIL TREATMENT MOBILE PUMP 60 KW
SPARE
SPARE

(NON ESSENTIAL)

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

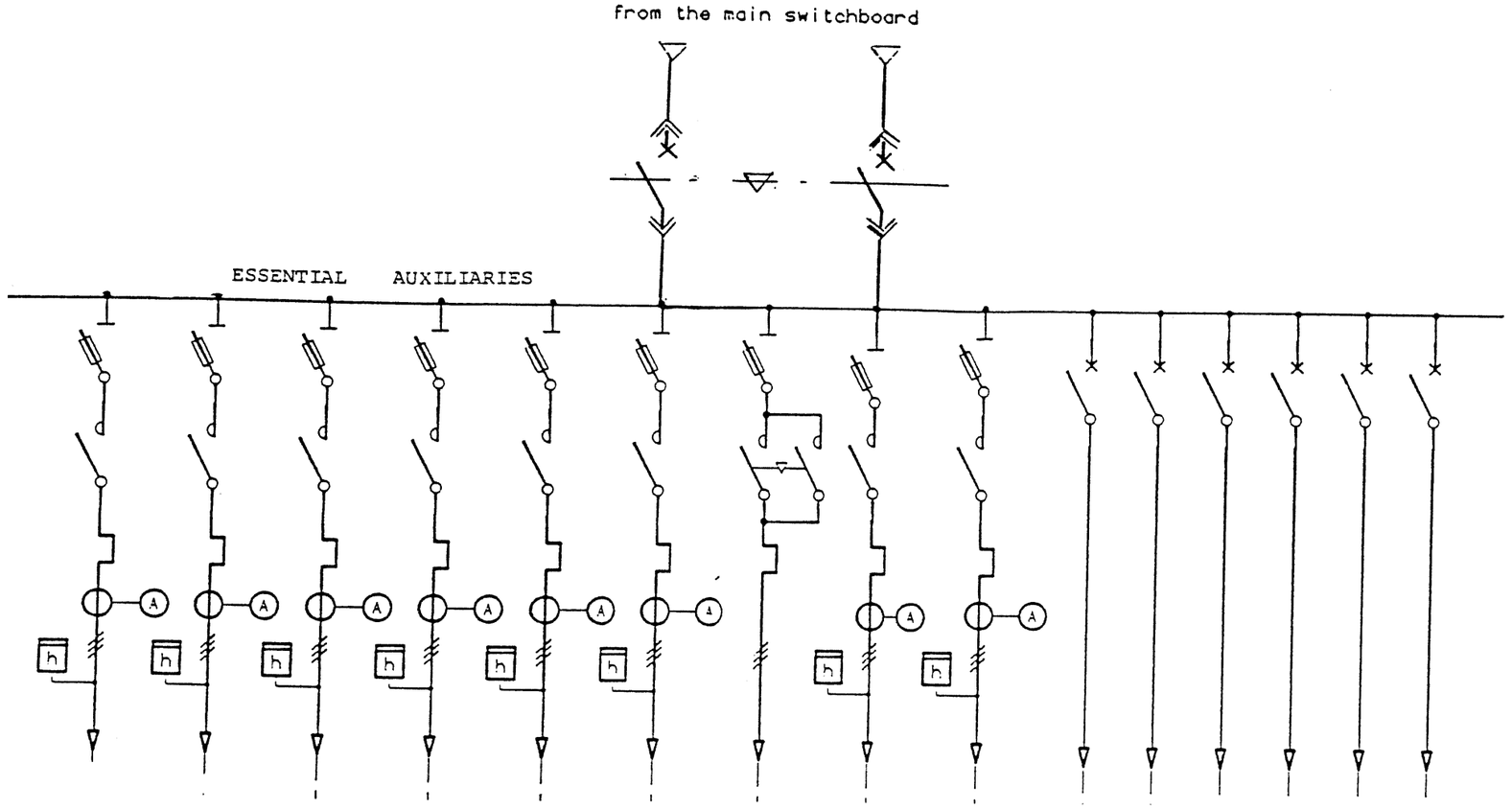
NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

POWER PLANT
GENERAL AUXILIARIES
SHEET 1/2

SOGREAH

NE 57

UNIT BOARD (unit 1 to 6)



TURBINE GOVERNOR PUMP 1	90KW
TURBINE GOVERNOR PUMP 2	90KW
TURBINE OIL PUMP	15KW
TURBINE BEARING OIL INJECTION	15KW
GENERATOR FAN 1	15KW
GENERATOR FAN 2	15KW
MOTORIZED VALVE	0.5KW
SPARE	
SPARE	
GENERATOR DESUMIDIFYING EQUIPMENT	0.7KW
SPARE	
SPARE	
SPARE	
SPARE	
SPARE	

EM

NA
SA
R

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND
GRAND BARRAGES SECTOR

NEW ESNA BARRAGE
AND POWER PROJECT
TENDER DOCUMENTS

UNIT AUXILIARIES

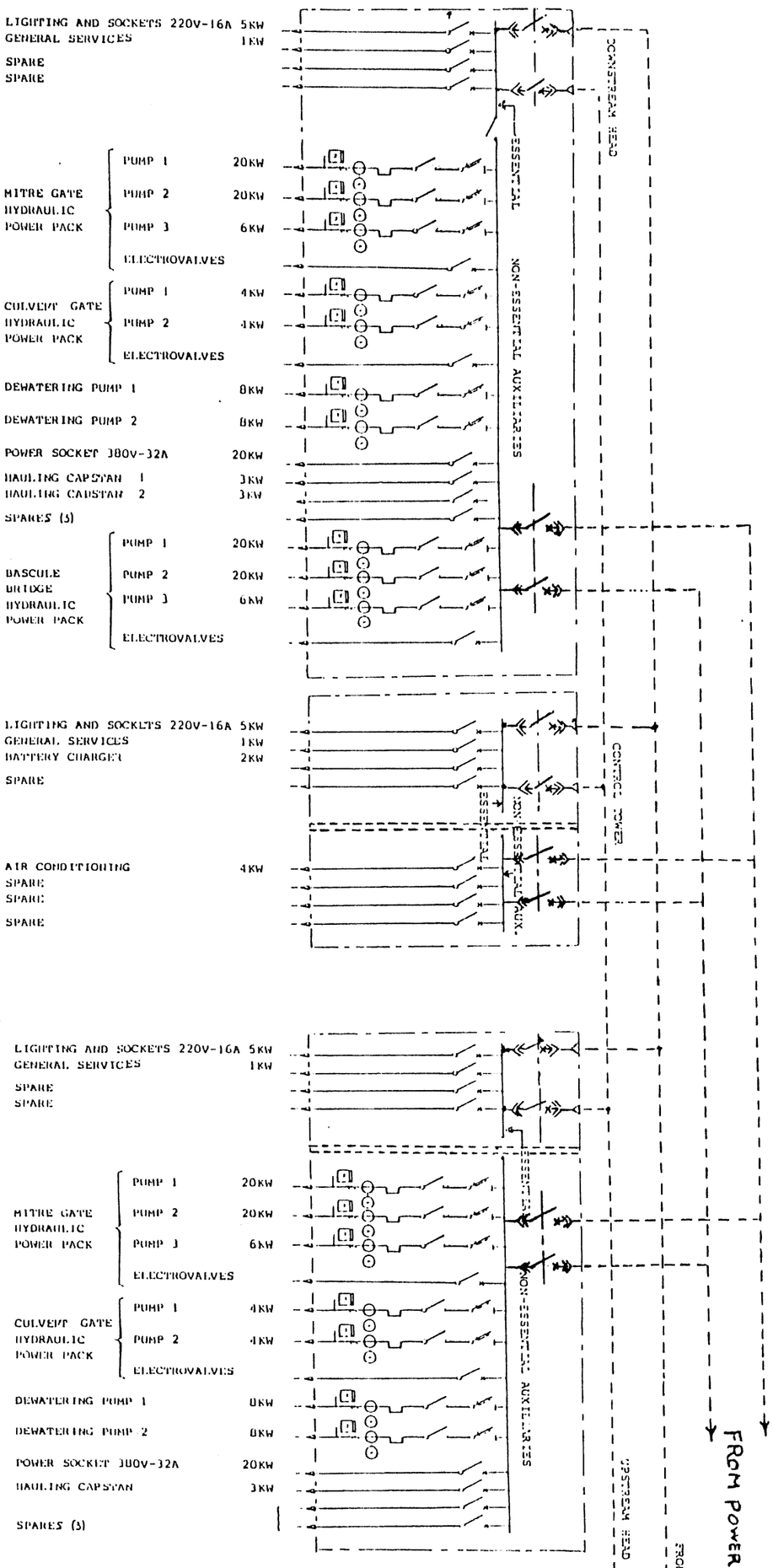
SOGREAH Ingenieurs Conseils GRENOBLE - FRANCE

APPROVED

REPORT 340461 R4

DATE 20/11/88

DRAWING No NE 58



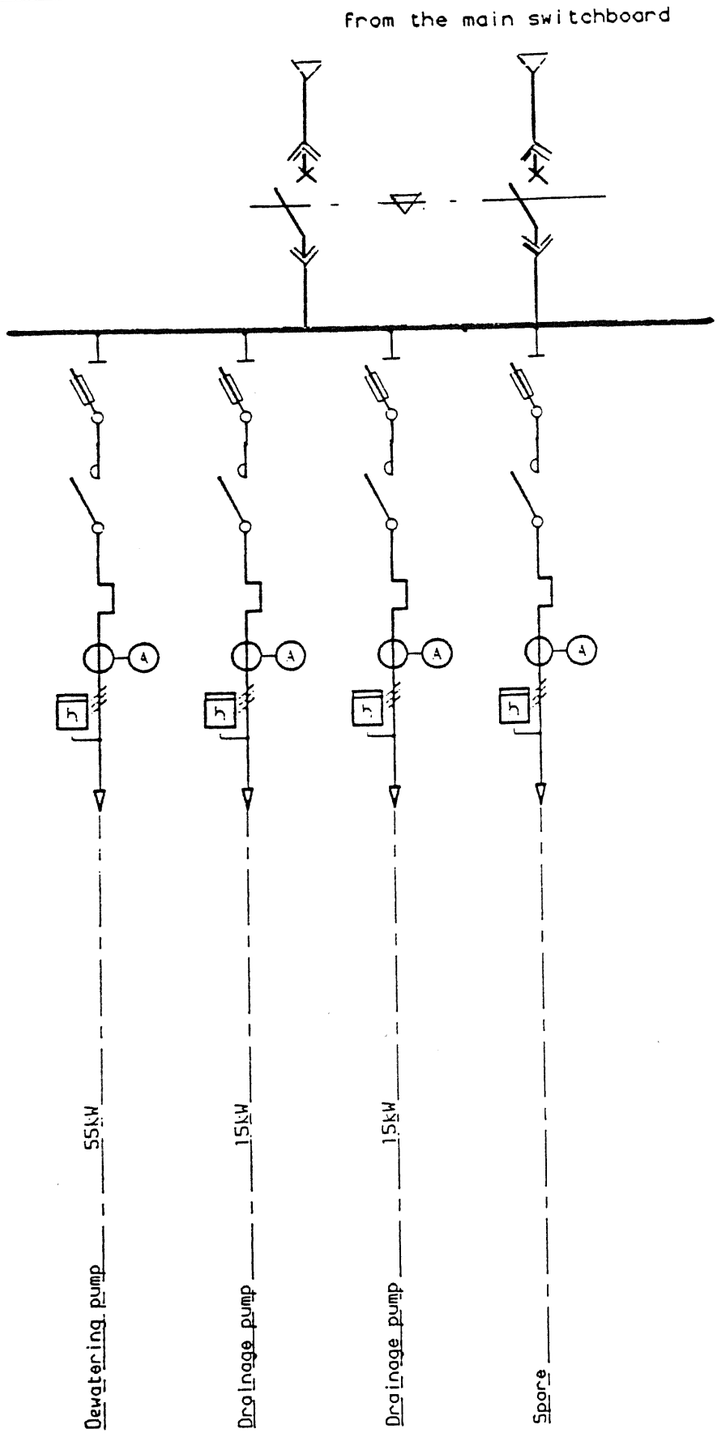
ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

LOCK AUXILIARIES

SOGREAH

DEWATERING BOARD (x3)



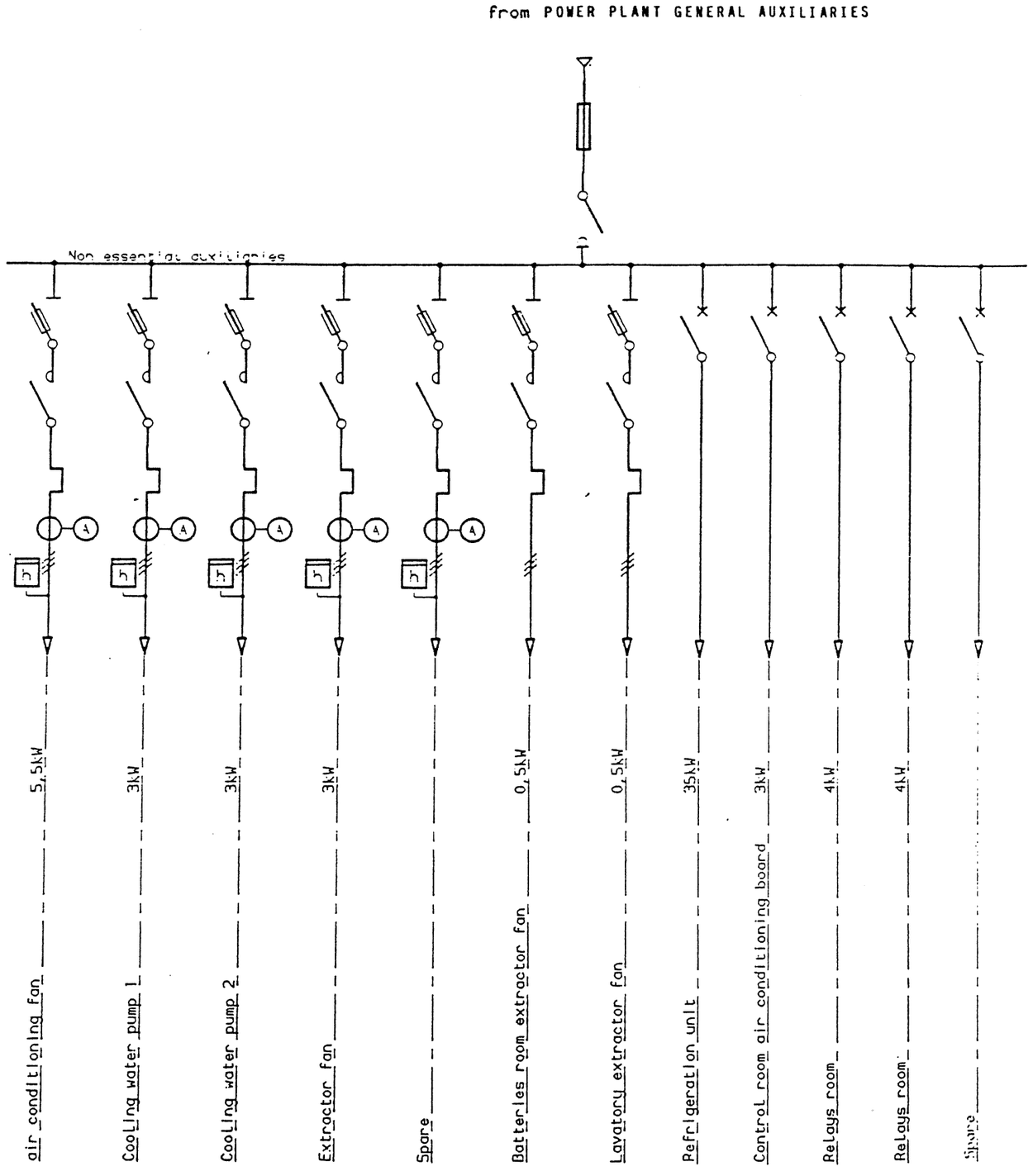
A N A S R EM

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

DEWATERING LOCAL BOARD

SOGREAH Ingenieurs Conseils GRENOBLE - FRANCE	APPROVED	REPORT 340461 R4 DATE 20/10/88	DRAWING No. NE 60

VENTILATION 1



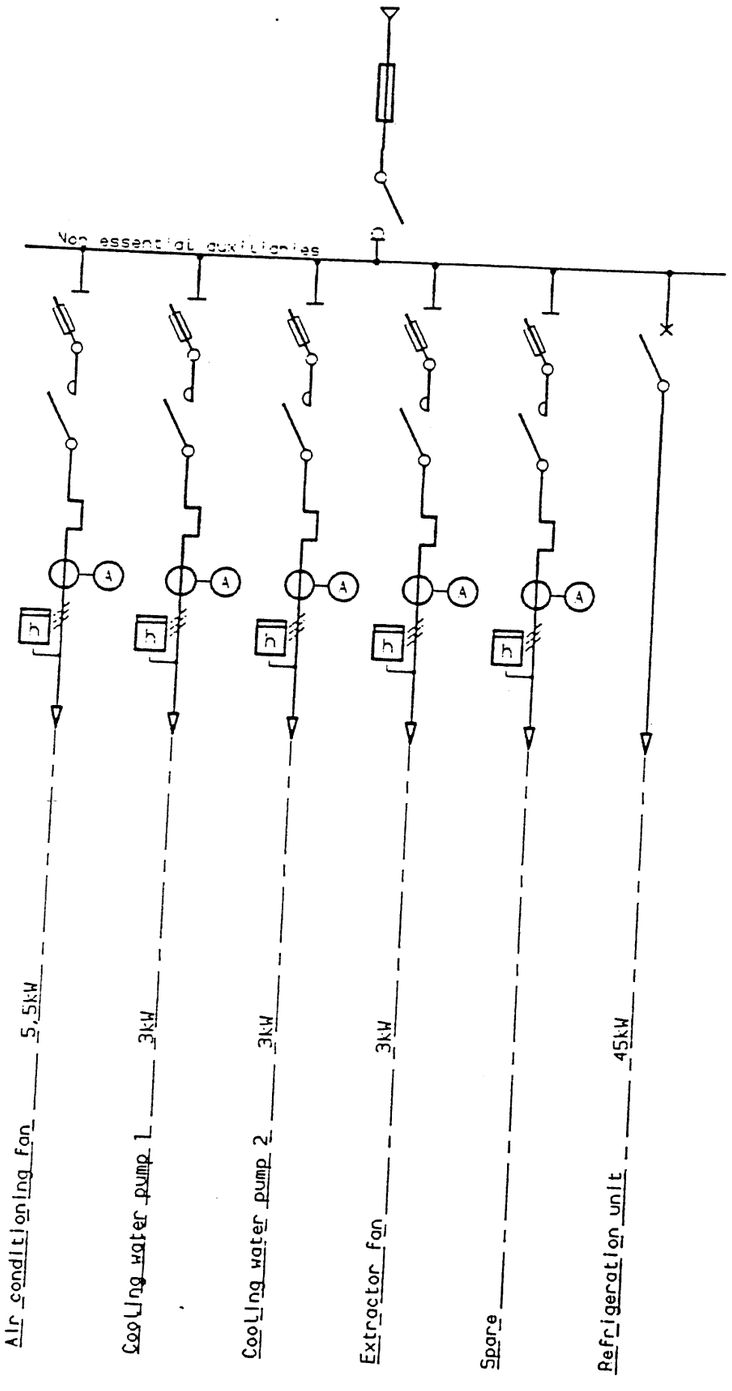
S EM.

A M A R

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS	
VENTILATION LOCAL BOARD N°1		
SOGREAH Ingénieurs Conseils GRENOBLE - FRANCE	APPROVED	REPORT 340461 R4 DATE 20/10/83
		DRAWING No. NE 61

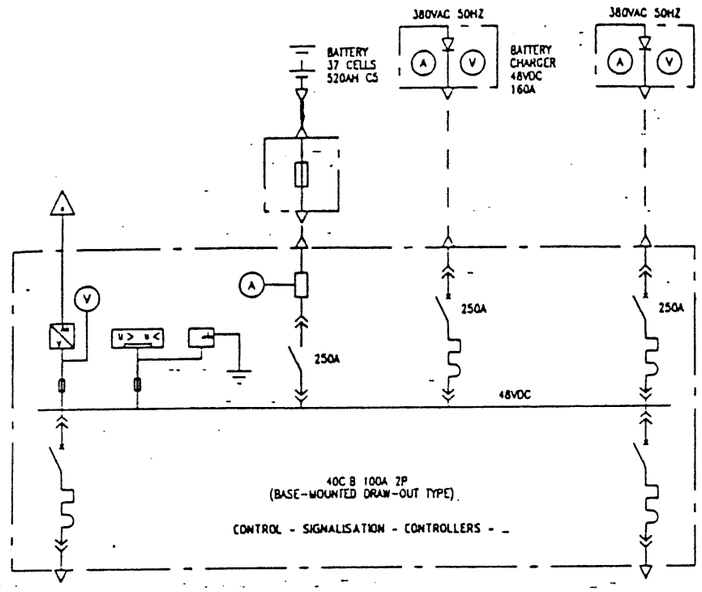
VENTILATION 2

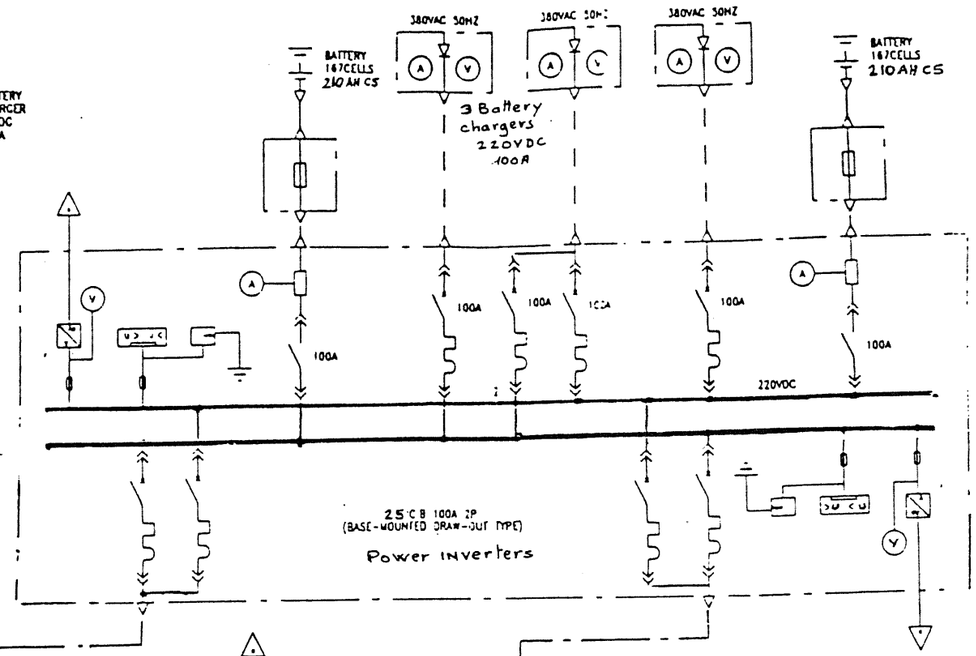
from POWER PLANT GENERAL AUXILIARIES

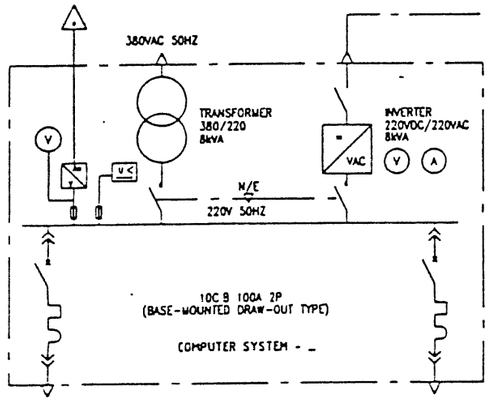


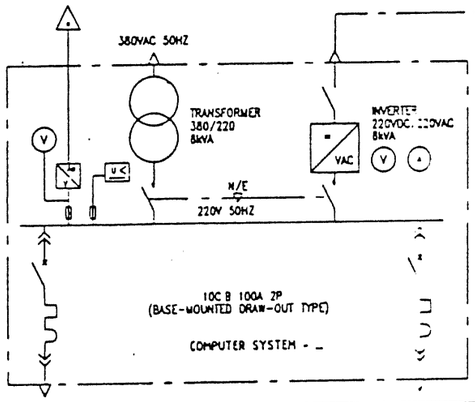
A S F.M.
N A R

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS
VENTILATION LOCAL BOARD N°2	
SOGREAH Ingénieurs Conseils GRENOBLE - FRANCE	APPROVED REPORT 340461 R4 DATE 20/10/88 DRAWING No NE 62

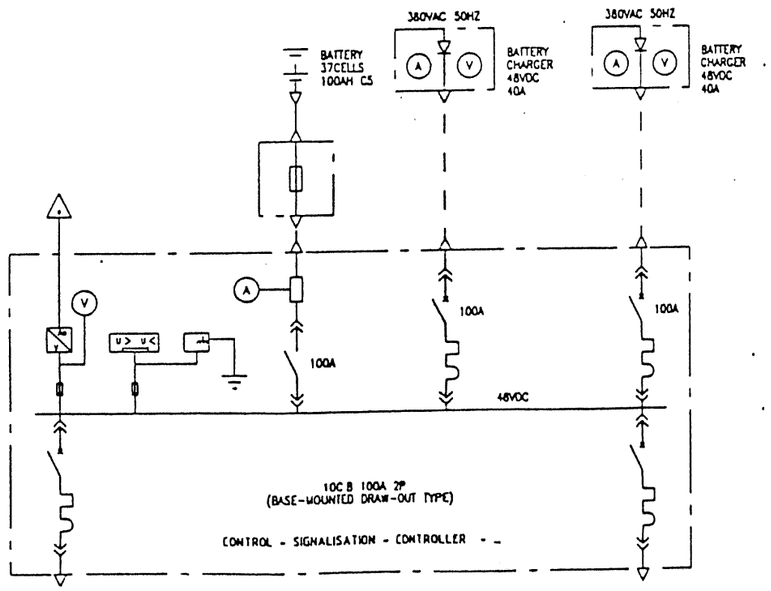








NAVIGATION LOCK



key

ANSI	DESIGNATION	CEI	ANSI	DESIGNATION	CEI
12	OVERSPEED DEVICE	V >	50-78	INSTAN A.C.-D.C. OVERCURRENT RELAY	I >>
13	SYNCHRONOUS-SPEED DEVICE	V	51	TIME-LAG OVERCURRENT RELAY	I >
14	UNDERSPEED DEVICE	V <	51	REVERSE TIME OVERCURRENT RELAY	I >
15	SPEED MATCHING DEVICE	V ≈	51N	NEUTRAL TIME-LAG OVERCURRENT RELAY	Io >
21	DISTANCE RELAY (IMPEDANCE)	Z	51V	OVERCURRENT WITH VOLTAGE RESTRAINT	I >/U <
21	DISTANCE RELAY (REACTANCE)	X	53	EXCITATION INCREASE RELAY	δ >
21	DISTANCE RELAY (RESISTANCE)	Y	55	POWER FACTOR RELAY	cos φ
23	TEMPERATURE CONTROL DEVICE	θ	56	EXCITATION RELAY	δ <
25	SYNCHRONIZER (VOLTAGE)	U ≈	59	OVERVOLTAGE RELAY	U >
25	SYNCHRONIZER (PHASE ANGLE)	φ ≈	59N	NEUTRAL OVERVOLTAGE RELAY	Uo >
25	SYNCHRONIZER (FREQUENCY)	f ≈	60	VOLTAGE BALANCE RELAY	U1 / U2
26	THERMOMETER DETECTOR	θ	60	CURRENT BALANCE RELAY	I1 / I2
27	UNDERVOLTAGE RELAY	U <	63	PRESSURE SWITCH	P
27	NO-VOLTAGE RELAY	U=0	64	MASS PROTECTION RELAY	
30	ANNOUNCIATOR RELAY	●	67	DIRECTIONAL OVERCURRENT RELAY	
32	DIRECT. ACTIVE POWER RELAY	P →	67N	DIRECT. NEUTRAL OVERCURRENT RELAY	Io >
32	DIRECT. REACTIVE POWER RELAY	Q →	74	ALARM RELAY	A
32	REVERSE ACTIVE POWER RELAY	P ←	78	MEASURING RELAY AND PHASE-RELAY PROTECTION	φ
32	REVERSE REACTIVE POWER RELAY	Q ←			
37	UNDERCURRENT RELAY	I <	79	AUTO-RECLOSING RELAY	
37	UNDER POWER RELAY	P <	81	FREQUENCY RELAY	f
38	MECHANICAL CONDITION MONITOR		87	DIFFERENTIAL PROTECTIVE RELAY	Δ I
40	EXCITATION FAULT RELAY	R <	87N	GROUND DIFFERENTIAL PROTECTIVE RELAY	Δ Io
40	NO-EXCITATION RELAY	R=0	95	BUCHHOLZ RELAY	
46	PHASE-BALANCE OR REVERSE-PHASE CURRENT RELAY	I >			
47	VOLTAGE RELAY	U	V/Hz	OVERFLUXING RELAY	V/f >
49	THERMAL RELAY				
49	THERMOSTAT				

SWITCH	INDICATING INSTRUMENT	CONVERTER OR MEASURING TRANSDUC.	ISOLATED PHASE BUS DUCT		
DISCONNECTING SWITCH	RECORDING INSTRUMENT	RECTIFIER EQUIPMENT	CABLE		
CIRCUIT BREAKER	INTREGRATING METER	PLUG AND SOCKET	OVERHEAD LINE		
CONTACTOR	MEASURING RELAY OR RELATED DEVICE	MOTOR OPERATED	CARRIER LINE TRAP		
FUSE	SIGNAL LAMP	LINK	PLC	POWER LINE CARRIER COUPLING DEVICE	
THERMAL ELEMENT MAGNETIC ELEMENT	INCANDESCENT LAMP	INVERTER			
COMMUTATOR	NEON LAMP	EARTH MASS			
ROTATING MACHINE	SPARK GAP	PULSE			
TWO WINDINGS TRANSFORMER	LIGHTNING ARRESTER	MECHANICAL INTERLOCK			
THREE WINDINGS TRANSFORMER	RESISTOR	MANUALLY OPERATED			
AUTO-TRANSFORMER	VARIABLE RESISTOR (R.T.D)	INTERLOCK FREE IMPRISONED			
CURRENT TRANSFORMER	CAPACITOR	PNEUMATIC OR HYDRAULIC CONTROL			
RESIDUAL CURRENT TRANSFORMER	INDUCTOR				
SHUNT	BATTERY				

△ POWER HOUSE CONTROL ROOM

EM S
A NH R

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

POWER PLANT AND LOCK
DC DISTRIBUTION SYSTEM

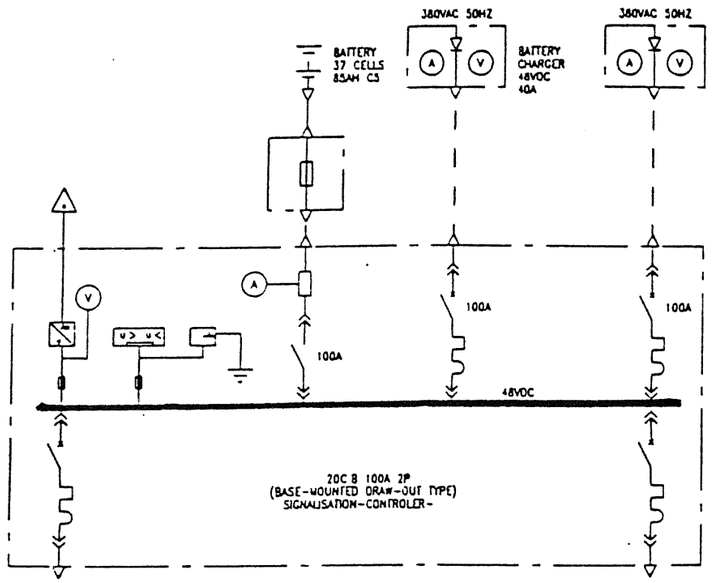
SOGREAH Ingenieurs Conseils GRENOBLE FRANCE

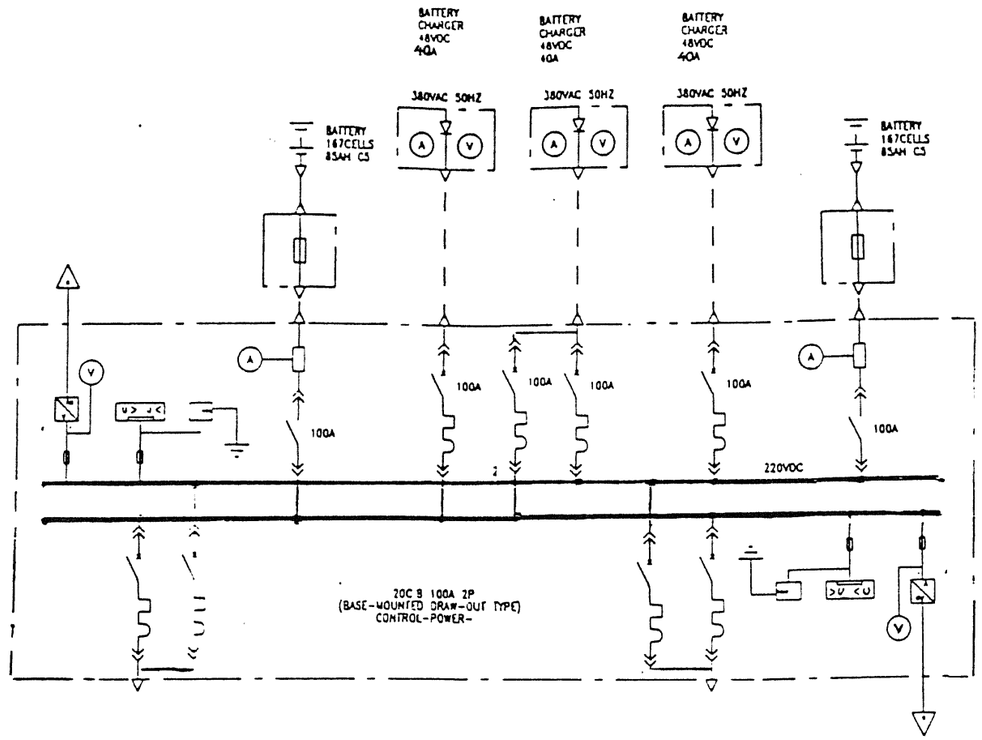
APPROVED

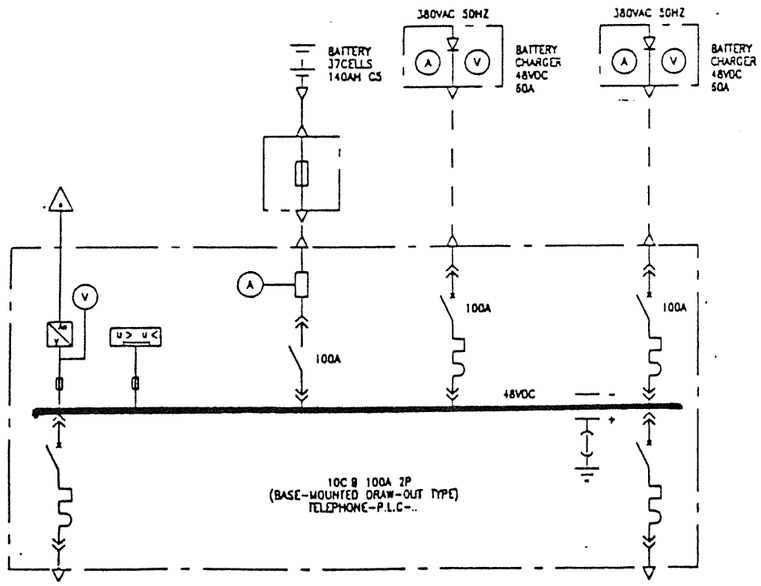
REPORT 340461 R4

DATE 20/10/88

DRAWING No NE 63







ANSI	DESIGNATION	CEI	ANSI	DESIGNATION	CEI
12	OVERSPEED DEVICE	V >	50-76	INSTAN. A.C.-D.C. OVERCURRENT RELAY	I >>
13	SYNCHRONOUS-SPEED DEVICE	V	51	TIME-LAG OVERCURRENT RELAY	I >
14	UNDERSPEED DEVICE	V <	51	REVERSE TIME OVERCURRENT RELAY	
15	SPEED MATCHING DEVICE	V ≈	51N	NEUTRAL TIME-LAG OVERCURRENT RELAY	Io >
21	DISTANCE RELAY (IMPEDANCE)	Z	51V	OVERCURRENT WITH VOLTAGE RESTRAINT	I >/U<
21	DISTANCE RELAY (REACTANCE)	X	53	EXCITATION INCREASE RELAY	B >
21	DISTANCE RELAY (RESISTANCE)	Y	55	POWER FACTOR RELAY	cos φ
23	TEMPERATURE CONTROL DEVICE	θ	56	EXCITATION RELAY	B
25	SYNCHRONIZER (VOLTAGE)	U ≈	59	OVERVOLTAGE RELAY	U >
25	SYNCHRONIZER (PHASE ANGLE)	φ ≈	59N	NEUTRAL OVERVOLTAGE RELAY	Uo >
25	SYNCHRONIZER (FREQUENCY)	f ≈	60	VOLTAGE BALANCE RELAY	U≈
26	THERMOMETER DETECTOR	θ	60	CURRENT BALANCE RELAY	I≈
27	UNDERVOLTAGE RELAY	U <	63	PRESSURE SWITCH	P
27	NO-VOLTAGE RELAY	U=0	64	MASS PROTECTION RELAY	
30	ANNOUNCIATOR RELAY	●	67	DIRECTIONAL OVERCURRENT RELAY	I →
32	DIRECT. ACTIVE POWER RELAY	P →	67N	DIRECT. NEUTRAL OVERCURRENT RELAY	Io →
32	DIRECT REACTIVE POWER RELAY	Q →	74	ALARM RELAY	
32	REVERSE ACTIVE POWER RELAY	P ←	78	MEASURING RELAY AND PHASE-RELAY PROTECTION	φ
32	REVERSE REACTIVE POWER RELAY	Q ←			
37	UNDERCURRENT RELAY	I <	79	AUTO-RECLOSING RELAY	↻
37	UNDER POWER RELAY	P <	81	FREQUENCY RELAY	f
38	MECHANICAL CONDITION MONITOR	⊸	87	DIFFERENTIAL PROTECTIVE RELAY	Δ I
40	EXCITATION FAULT RELAY	B <	87N	GROUND DIFFERENTIAL PROTECTIVE RELAY	Δ I ÷
40	NO-EXCITATION RELAY	B=0	95	BUCHHOLZ RELAY	
46	PHASE-BALANCE OR REVERSE-PHASE CURRENT RELAY	I >			
47	VOLTAGE RELAY	U	V/Hz	OVERFLUXING RELAY	V/f >
48	THERMAL RELAY				
49	THERMOSTAT				

	SWITCH	(V)	INDICATING INSTRUMENT		CONVERTER OR MEASURING TRANSDUC		ISOLATED PHASE BUS DUCT
	DISCONNECTING SWITCH	(h)	RECORDING INSTRUMENT		RECTIFIER EQUIPMENT		CABLE
	CIRCUIT BREAKER	(Wh)	INTREGRATING METER		PLUG AND SOCKET		OVERHEAD LINE
	CONTACTOR		MEASURING RELAY OR RELATED DEVICE		MOTOR OPERATED		CARRIER LINE TRAP
	FUSE	⊗	SIGNAL LAMP		LINK	PLC CP	POWER LINE CARRIER COUPLING DEVICE
	THERMAL ELEMENT MAGNETIC ELEMENT	⊖	INCANDESCENT LAMP		INVERTER		
	COMMUTATOR	⊖	NEON LAMP		EARTH MASS		
	ROTATING MACHINE		SPARK GAP		PULSE		
	TWO WINDINGS TRANSFORMER		LIGHTNING ARRESTER		MECHANICAL INTERLOCK		
	THREE WINDINGS TRANSFORMER		RESISTOR		MANUALLY OPERATED		
	AUTO-TRANSFORMER		VARIABLE RESISTOR (R.T.D.)		INTERLOCK FREE / SUPERVISED		
	CURRENT TRANSFORMER		CAPACITOR		PNEUMATIC OR HYDRAULIC CONTROL		
	RESIDUAL CURRENT TRANSFORMER		INDUCTOR				
	SHUNT		BATTERY				

△ POWER HOUSE CONTROL ROOM

EM

SA

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

NEW ESNA SWITCHGEAR
DC DISTRIBUTION SYSTEM

SOGREAH Ingénieurs Conseils GRENOBLE FRANCE

APPROVED

REPORT 340461 R4

DATE 20/10/88

DRAWING No NE.64

MIMIC BOARD

OPERATOR STATION 1

ALARMS

OPERATION

KEYBOARD

EVENT PRINTER

UTILITY PRINTER

OUTPUTS

OPERATOR STATION 2

ALARMS

OPERATION

KEYBOARD

EVENT PRINTER

UTILITY PRINTER

MEMORY BUS

CPU 1

AND MAIN

MEMORY

FAST

INTER

CPU

LINK

I/O BUS

CRT CONTROLLER

CONTROL ROOM

DISPATCHING

(FUTURE)

CRT CONTROLLER

MEMORY BUS

FAST

INTER

CPU

LINK

CPU 2

AND MAIN

MEMORY

I/O BUS

MEMORY

DISK

CRT

PRINTER

PROGRAMMER

CONSOLE

PROGRAMMING TOOLS

PROGRAMMER

CONSOLE

PRINTER

CRT

MEMORY

DISK

PROGRAMMING Tools

LOCAL EQUIPMENTS

LOCAL

CONTROL

BOARD

RELAYING

CUBICLE

S.C.

I/O

LOCAL

CONTROL

DESK

LOCAL

CONTROL

BOARD

&

ELECTR.

PROTECT.

(Same as G1)

LOCAL

CONTROL

BOARD (S)

LOCAL

CONTROL

BOARD (S)

LOCAL

PROGRAMMABLE

CONTROLLERS

PROGRAMMING TOOLS

3\ Ø

SUBSTATION

NAVIGATION LOCK

G 1

G 2 to G 6

GENERAL AUXIL.

SPILLWAY

POWER PLANT

BUS	PUNCHED TAPE	DELTA-STAR	TRANSMITTING STATION
TIME SWITCHING	MEMORY	PLOTTER	RECEIVING STATION
LOAD SWITCHING	DOCUMENT	COUPLER	TRANSMITTING AND RECEIVING STATION
WIRE TO WIRE	CENTRAL UNIT	CLOCK	TRANSDUCER
ANALOG LINE	TAPE READER	MASTER CLOCK	LOGIC OUTPUT TRANSDUCER
SERIAL TYPE WIRE	MAGNETIC TAPE READER-RECORDER	INDICATING INSTRUMENT	ANALOGIC OUTPUT TRANSDUCER
HF LINK	CASSETTE READER-RECORDER	RECORDING INSTRUMENT	TDR
OVERHEAD LINE	PRINTER	ENERGY METER	SC SERIAL COMMUNICATION
TYPE OF LINE : T TELEPHONY, TELEGRAPHY AND TRANSMISSION OF DATA; V VIDEO CHANNEL; S SOUND CHANNEL	HARD COPY	TRACK BALL	I/O INPUT / OUTPUT
INPUT	DISPLAY SCREEN	JOYSTICK	
OUTPUT	• TYPE OF SCREEN : G GRAPHIC; T/G ALPHANUMERICAL—GRAPHIC; AN ALPHANUMERICAL	LIGHTPEN	
DISKETTE	• COLOUR	MODEM	
DISK	KEYBOARD	DESK	
MAGNETIC TAPE	MICRO-CONSOLE	MIMIC PANEL	
CASSETTE			

ARAB REPUBLIC OF EGYPT

MINISTRY OF IRRIGATION

RESERVOIRS AND

GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT

TENDER DOCUMENTS

POWER PLANT CONTROL SYSTEM

SOGREAH Ingénieurs Conseils GRENOBLE FRANCE

APPROVED

REPORT 340461 R4

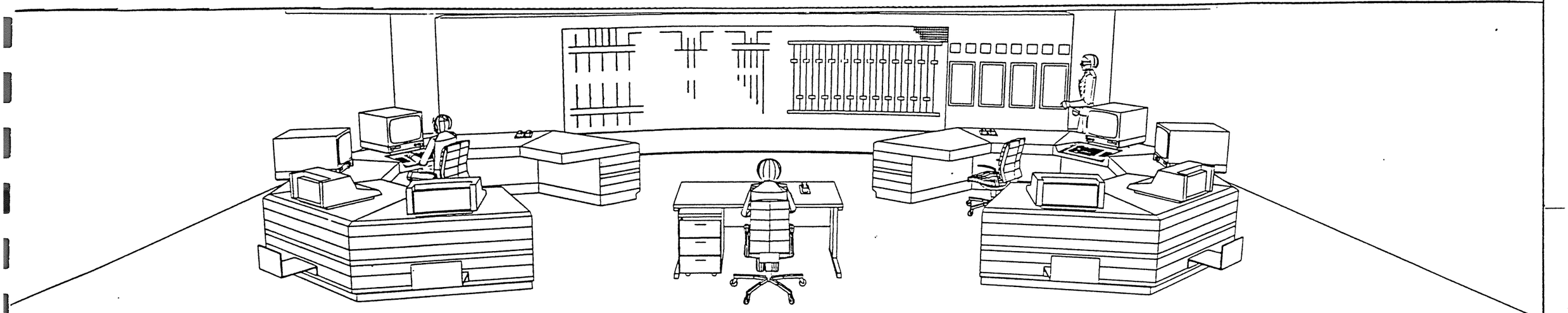
DATE JUNE 1986

DRAWING No. NE 65

S A

E M

R



ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND
GRAND BARRAGES SECTOR

NEW ESNA BARRAGE
AND POWER PROJECT
TENDER DOCUMENTS

CONTROL ROOM

PERSPECTIVE

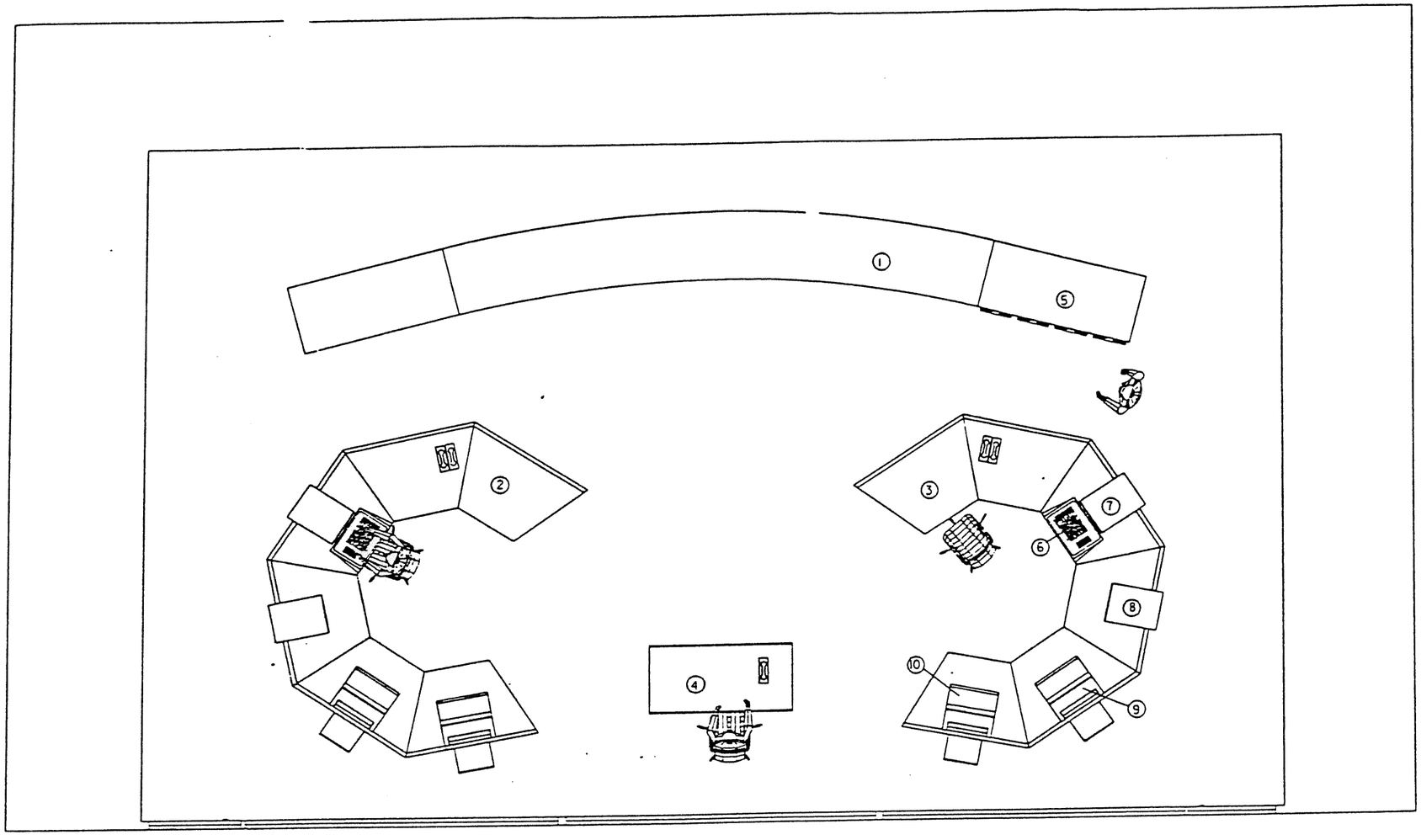
SOGREAH
Ingénieurs Conseils
GRENOBLE - FRANCE

APPROVED

REPORT 340461 R4

DATE JUNE 1986

DRAWING No.
NE 66



1/ MOSAIC MIMIC BOARD
2/ CONTROL DESK Nr 1
3/ CONTROI DESK Nr 2
4/ WATCH TABLE
5/ RECORDERS PANEL
6/ OPERATOR KEY BOARD
7/ ALARM CRT
8/ UTILITY CRT
9/ EVENTS PRINTER
10/ LOGS PRINTER

SAERM

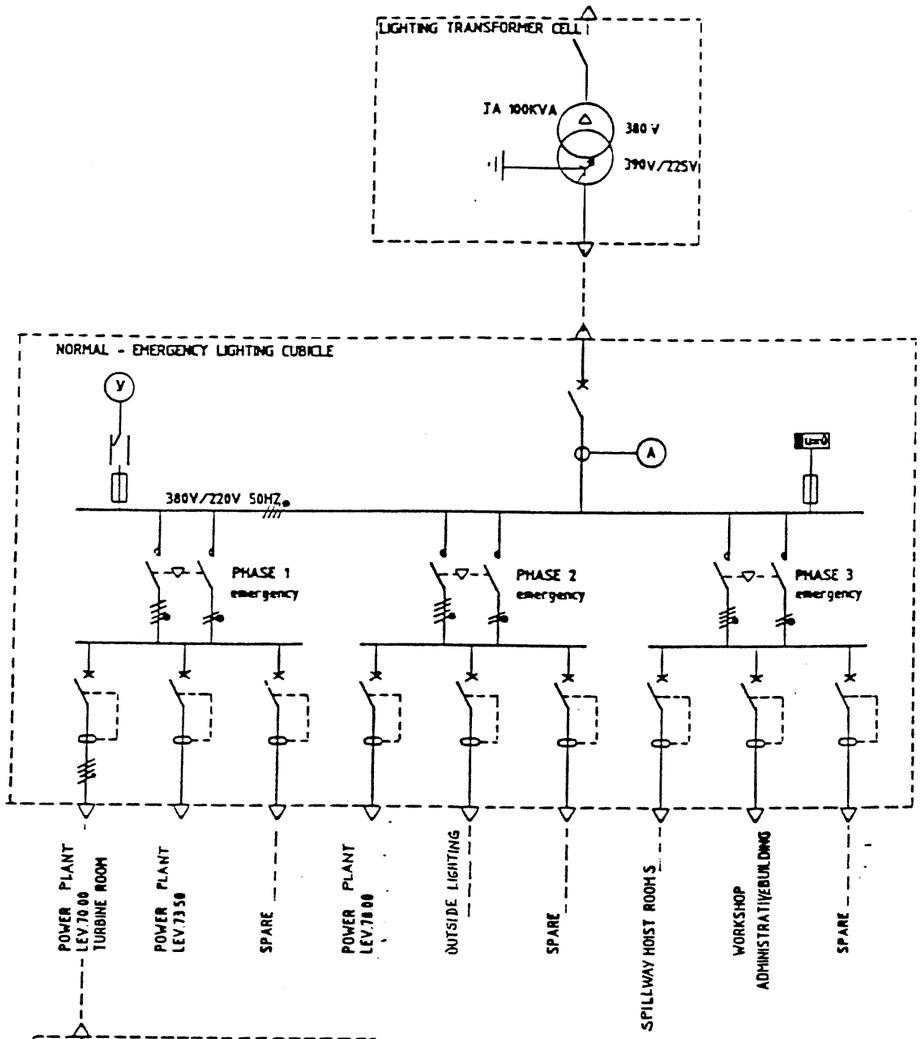
ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

CONTROL ROOM

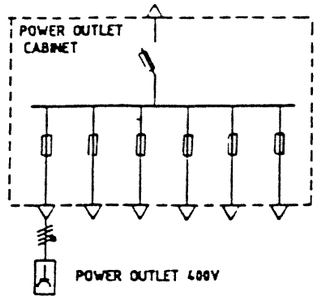
TOP VIEW

SOGREAH Ingenieurs Conseils GRENOBLE - FRANCE	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DRAWING No NE 67

FROM MAIN DISTRIBUTION BOARD 400V AC



FROM MAIN DISTRIBUTION BOARD 400V AC



ANSI	DESIGNATION	CEI	ANSI	DESIGNATION
12	OVERSPEED DEVICE	V >	50-76	INSTAN. A.C.-D.C. OVERCURRENT RELAY
13	SYNCHRONOUS-SPEED DEVICE	V	51	TIME-LAG OVERCURRENT RELAY
14	UNDERSPEED DEVICE	V <	51	REVERSE TIME OVERCURRENT RELAY
15	SPEED MATCHING DEVICE	V ≈	51N	NEUTRAL TIME-LAG OVERCURRENT RELAY
21	DISTANCE RELAY (IMPEDANCE)	Z	51V	OVERCURRENT WITH VOLTAGE RESTRAINT
21	DISTANCE RELAY (REACTANCE)	X	53	EXCITATION INCREASE RELAY
21	DISTANCE RELAY (RESISTANCE)	Y	55	POWER FACTOR RELAY
23	TEMPERATURE CONTROL DEVICE	θ	56	EXCITATION RELAY
25	SYNCHRONIZER (VOLTAGE)	U ≈	59	OVERVOLTAGE RELAY
25	SYNCHRONIZER (PHASE ANGLE)	φ ≈	59N	NEUTRAL OVERVOLTAGE RELAY
25	SYNCHRONIZER (FREQUENCY)	f ≈	60	VOLTAGE BALANCE RELAY
26	THERMOMETER DETECTOR	θ	60	CURRENT BALANCE RELAY
27	UNDERVOLTAGE RELAY	U <	63	PRESSURE SWITCH
27	NO-VOLTAGE RELAY	U=0	64	MASS PROTECTION RELAY
30	ANNUNCIATOR RELAY	⊕	67	DIRECTIONAL OVERCURRENT RELAY
32	DIRECT. ACTIVE POWER RELAY	P →	67N	DIRECT. NEUTRAL OVERCURRENT RELAY
32	DIRECT. REACTIVE POWER RELAY	Q →	74	ALARM RELAY
32	REVERSE ACTIVE POWER RELAY	P ←	78	MEASURING RELAY AND PHASE-RELAY
32	REVERSE REACTIVE POWER RELAY	Q ←		PROTECTION
37	UNDERCURRENT RELAY	I <	79	AUTO-RECLOSING RELAY
37	UNDER POWER RELAY	P <	81	FREQUENCY RELAY
39	MECHANICAL CONDITION MONITOR	⏚	87	DIFFERENTIAL PROTECTIVE RELAY
40	EXCITATION FAULT RELAY	R <	87N	GROUND DIFFERENTIAL PROTECTIVE RELAY
40	NO-EXCITATION RELAY	R=0	95	BUCHHOLZ RELAY
46	PHASE-BALANCE OR REVERSE-PHASE CURRENT RELAY	I >		
47	VOLTAGE RELAY	U	V/Hz	OVERFLUXING RELAY
49	THERMAL RELAY	⊓		
49	THERMOSTAT	θ		

SWITCH	INDICATING INSTRUMENT	CONVERTER OR MEASURING TRANSDUCER	SOLATED PHASE BUS DUCT
DISCONNECTING SWITCH	RECORDING INSTRUMENT	RECTIFIER EQUIPMENT	CABLE
CIRCUIT BREAKER	INTEGRATING METER	PLUG AND SOCKET	OVERHEAD LINE
CONTACTOR	MEASURING RELAY OR RELATED DEVICE	MOTOR OPERATED	CARRIER LINE TRAP
FUSE	SIGNAL LAMP	LINK	POWER LINE CARRIER COUPLING DEVICE
THERMAL ELEMENT MAGNETIC ELEMENT	INCANDESCENT LAMP	INVERTER	
COMMUTATOR	NEON LAMP	EARTH MASS	
ROTATING MACHINE	SPARK GAP	PULSE	
TWO WINDINGS TRANSFORMER	LIGHTNING ARRESTER	MECHANICAL INTERLOCK	
THREE WINDINGS TRANSFORMER	RESISTOR	MANUALLY OPERATED	
AUTO-TRANSFORMER	VARIABLE RESISTOR (R, T, D)	INTERLOCK FREE WIRE MOMENTARY	
CURRENT TRANSFORMER	CAPACITOR	PNEUMATIC OR HYDRAULIC CONTROL	
RESIDUAL CURRENT TRANSFORMER	INDUCTOR		
SHUNT	BATTERY		

EM.

5 A e NA

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

LIGHTING AND SOCKET OUTLET SYSTEM

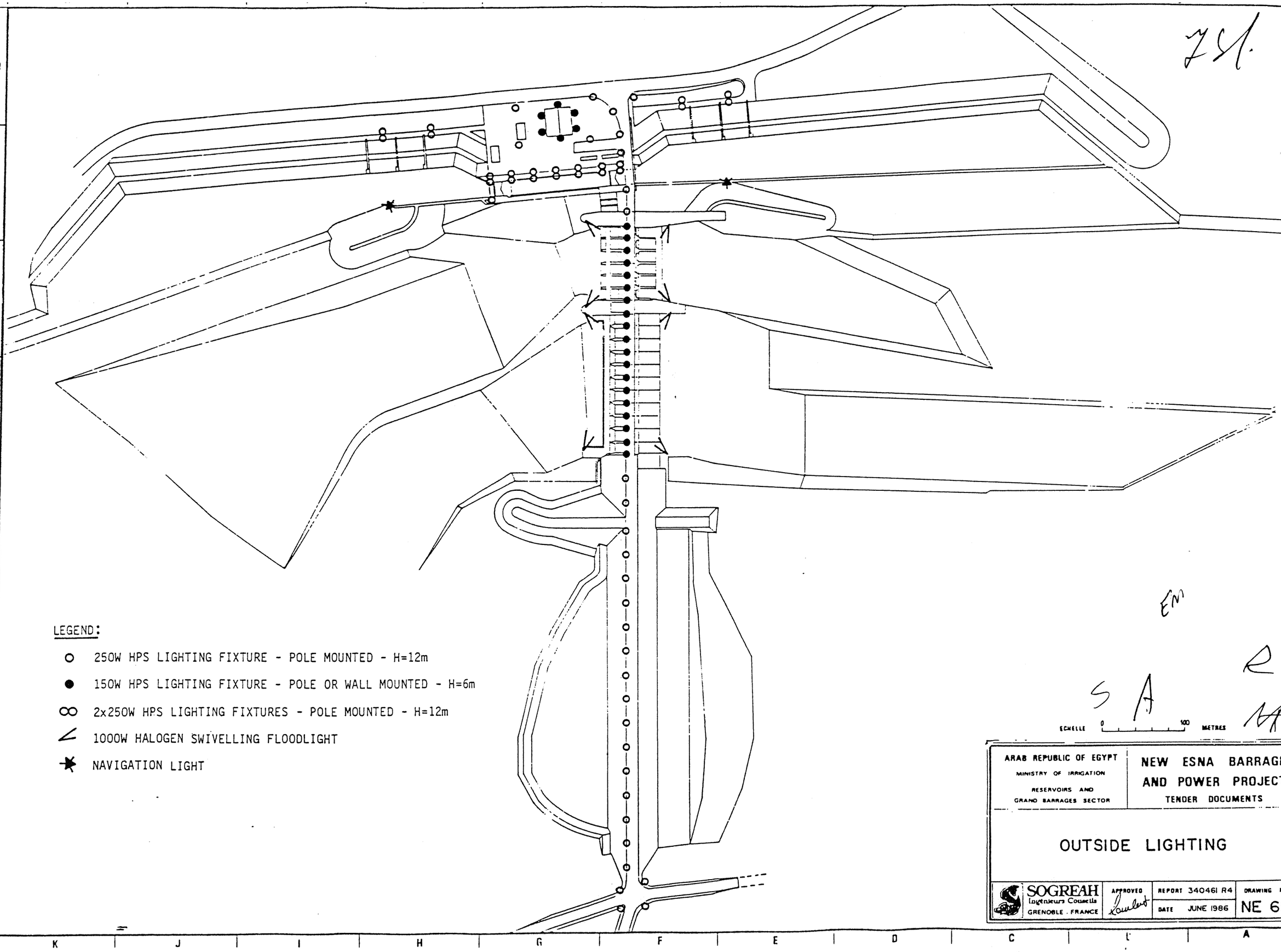
SOGREAH Ingenieurs Conseils GRENOBLE . FRANCE

APPROVED

REPORT 34046I R4

DATE JUNE 1986

DRAWING No NE 68



LEGEND:

- ○ 250W HPS LIGHTING FIXTURE - POLE MOUNTED - H=12m
- ● 150W HPS LIGHTING FIXTURE - POLE OR WALL MOUNTED - H=6m
- ∞ 2x250W HPS LIGHTING FIXTURES - POLE MOUNTED - H=12m
- ∠ 1000W HALOGEN SWIVELLING FLOODLIGHT
- ✱ NAVIGATION LIGHT

ECHELLE 0 100 METRES

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS

OUTSIDE LIGHTING

SOGREAH Ingénieurs Conseils GRENOBLE . FRANCE	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DRAWING No. NE 69

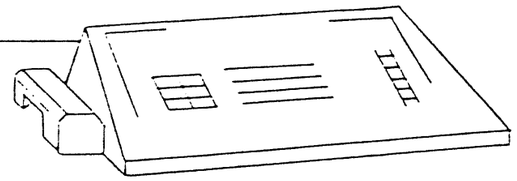
NATIONAL TELEPHONE NETWORK

EEA PRIVATE NETWORK

P.A.B.X.

PRIVATE AUTOMATIC BRANCH EXCHANGE

ATTENDANT CONSOLE
(ADMINISTRATIVE BUILDING)



DISTRIBUTION 48V D.C.

GENERAL DISTRIBUTOR

CONFERENCE ROOM
CONTROL ROOM
OFFICE LEVEL. 78.00
Q:5

PAGING SYSTEM

SPILLWAY
Q:2

POWER PLANT LEV.70.00
Q: 2

POWER PLANT LEV.73.50
Q.2

LOCK (CONTROL TOWER)
Q.1

ADMINISTRATIVE BUILDING
CONTROL ROOM
Q.6+1

SWITCHYARD
Q.2

WORKSHOP STOREHOUSE
Q.2

TRANSFORMER STATION
Q:1

DIESEL ROOMS
Q.2

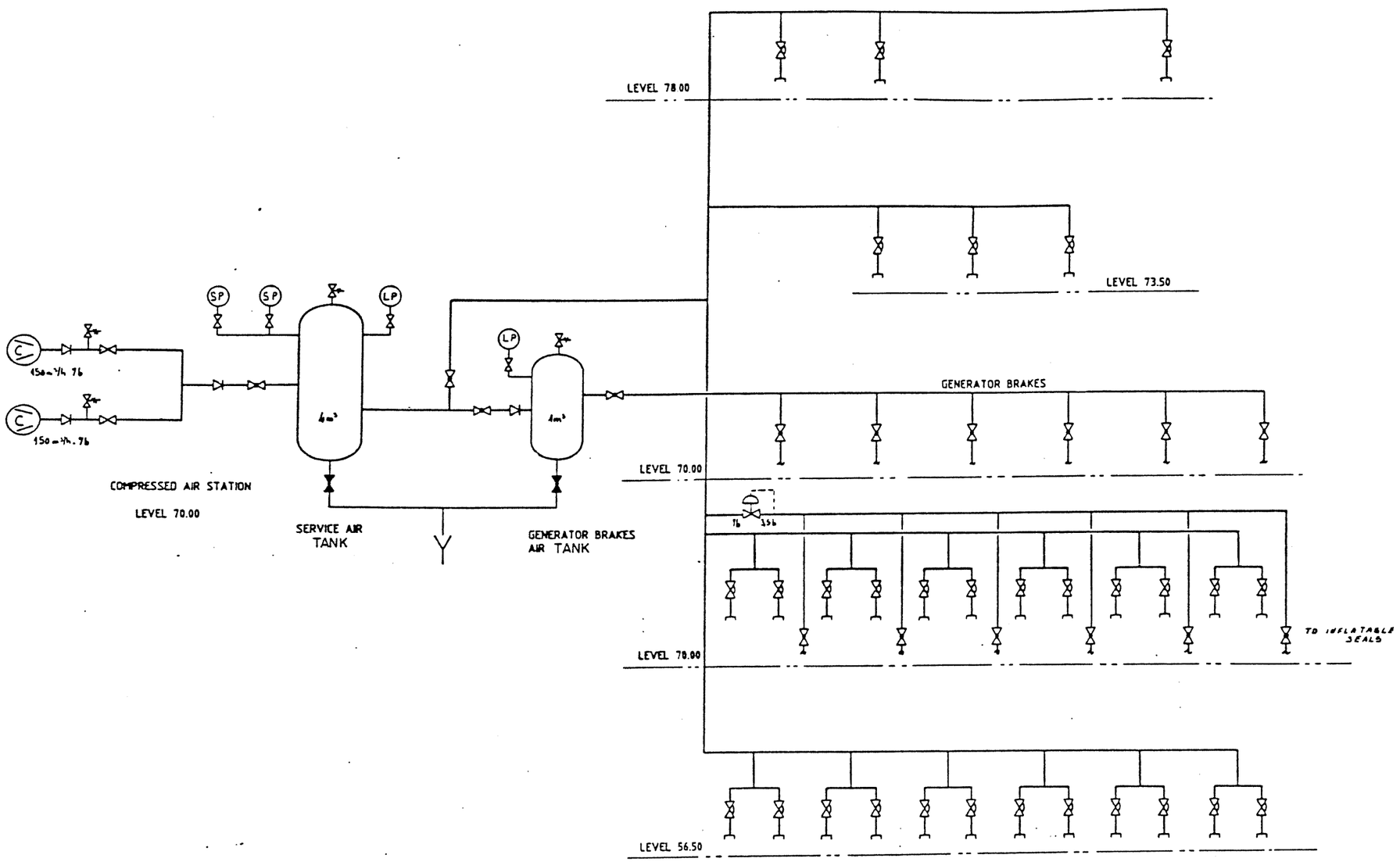
LEGEND

- DESK TYPE SET
- WALL MOUNTING SET
- TELEPHONE SET INSTALLED INSIDE (SOUND PROOF EQUIPED WITH HORN)
- TIGHT TELEPHONE SET

S A

R EM.

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS	
TELEPHONE NETWORK		
SOGREAH GRENOBLE FRANCE	APPROVED	REPORT 34046I R4 DATE JUNE 1986
		DRAWING No NE 70



OPEN VALVE	DELUGE VALVE	SUCTION BOX	FAN
CLOSED VALVE	BUTTERFLY VALVE	DRAIN	COMPRESSOR
HAND OPERATED	PISTON VALVE	REDUCER	PUMP
1/4 TURN OPERATED	MOTORIZED VALVE	HOSE CONNECTION	EXCHANGER
GLOBE VALVE	ELECTRO VALVE	AUTOMATIC STRAINER	PRESSURE GAUGE
GATE VALVE	REDUCING VALVE	WYE FILTER	INDICATING THERMOMETER
PLUG VALVE	STABILISATION VALVE	MANHOLE	FLOW INDICATOR
DIAPHRAGM VALVE	CHECK VALVE	FLOW LIMITOR	PRESSURE SWITCH
NEEDLE VALVE	FLAP VALVE		DIFFERENTIAL PRESSURE
SAFETY VALVE	REGULATING THREE WAY VALVE		-

AIR EXHAUST	HUMIDIFYING SECTION	AIR GRILL OUTLET
AIR COOLER	AIR HEATER	AIR GRILL INTAKE
AIR FILTER	AIR VALVE	DOOR GRILL

COOLING WATER SUPPLY	OUTDOOR AIR DUCT
CHILLEDWATER SUPPLY	SUPPLY AIR DUCT
CHILLEDWATER RETURN	RECIRCULATED AIR DUCT
CONDENSER WATER SUPPLY	EXTRACTED AIR DUCT
CONDENSER WATER RETURN	

EA'

SAR NA

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

LOW PRESSURE COMPRESSED AIR DISTRIBUTION SYSTEM

SOGREAH Ingénieurs Conseils GRENOBLE - FRANCE

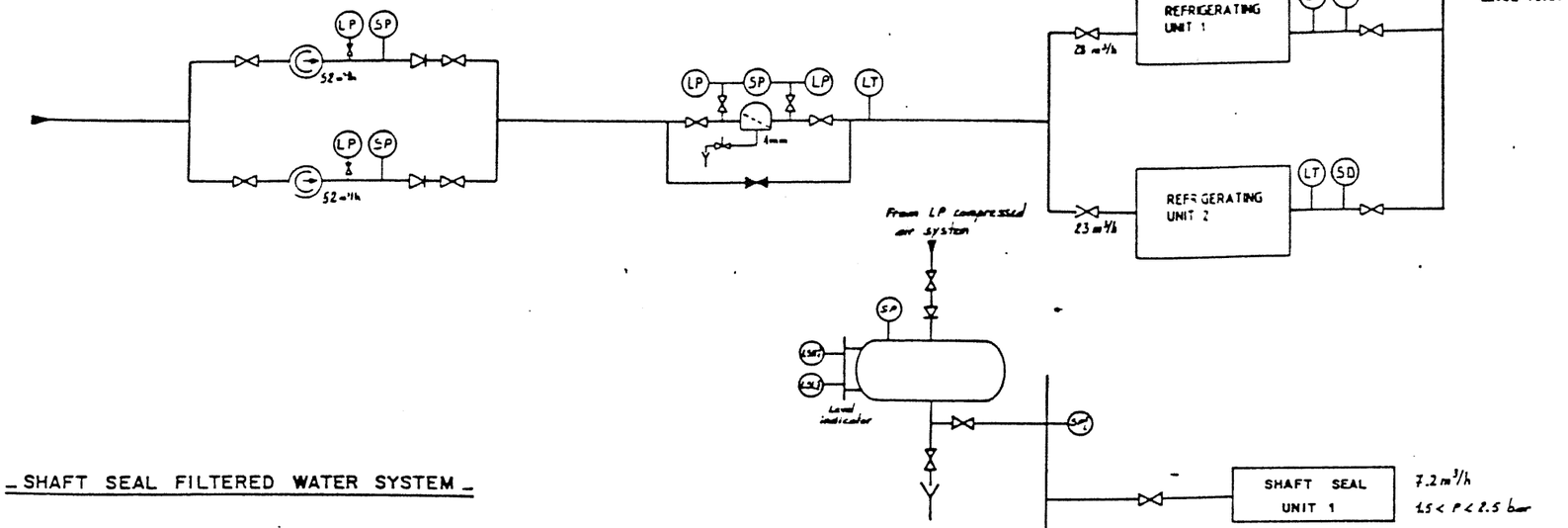
APPROVED

REPORT 340461 R4

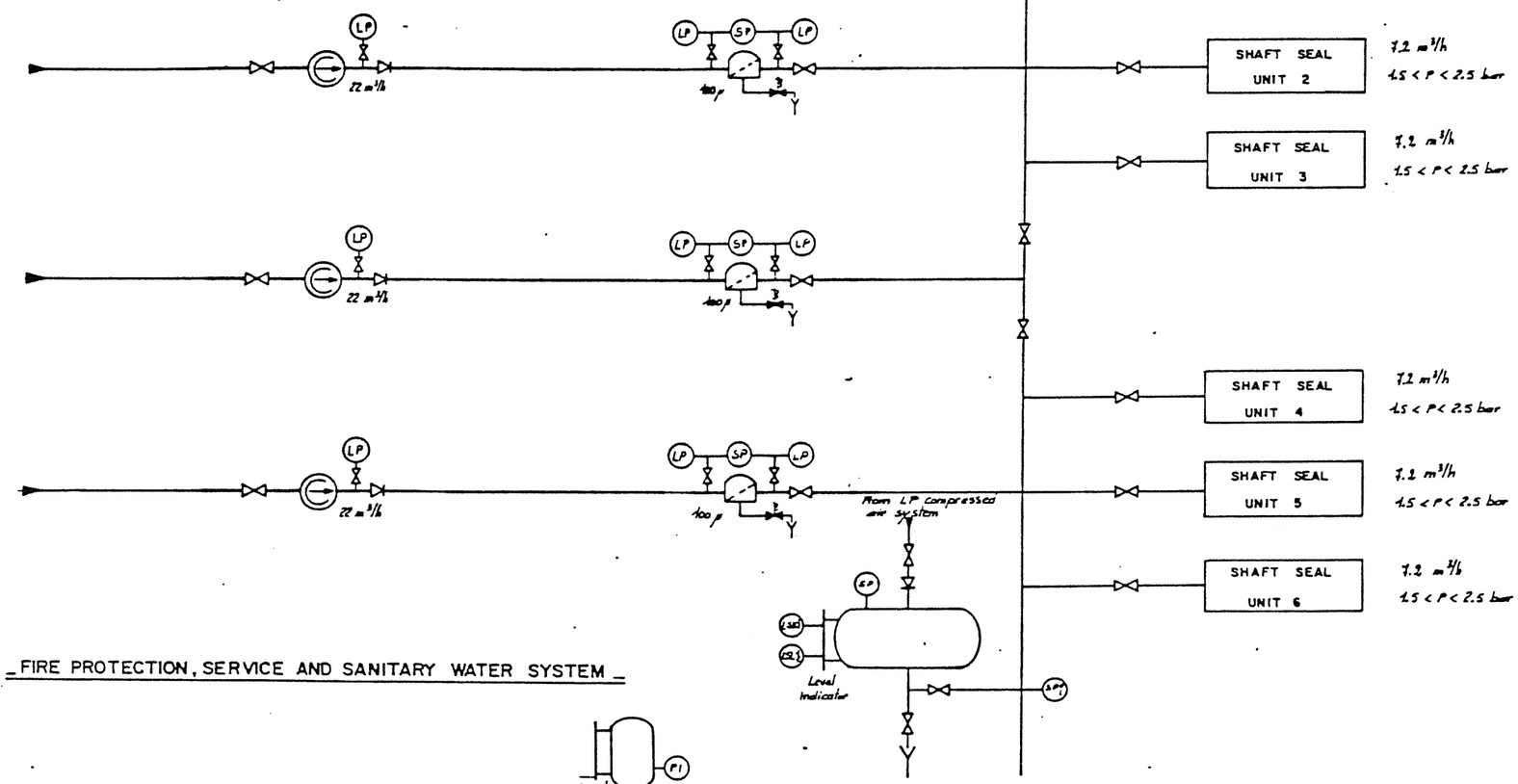
DATE JUNE 1986

DRAWING No. NE.81

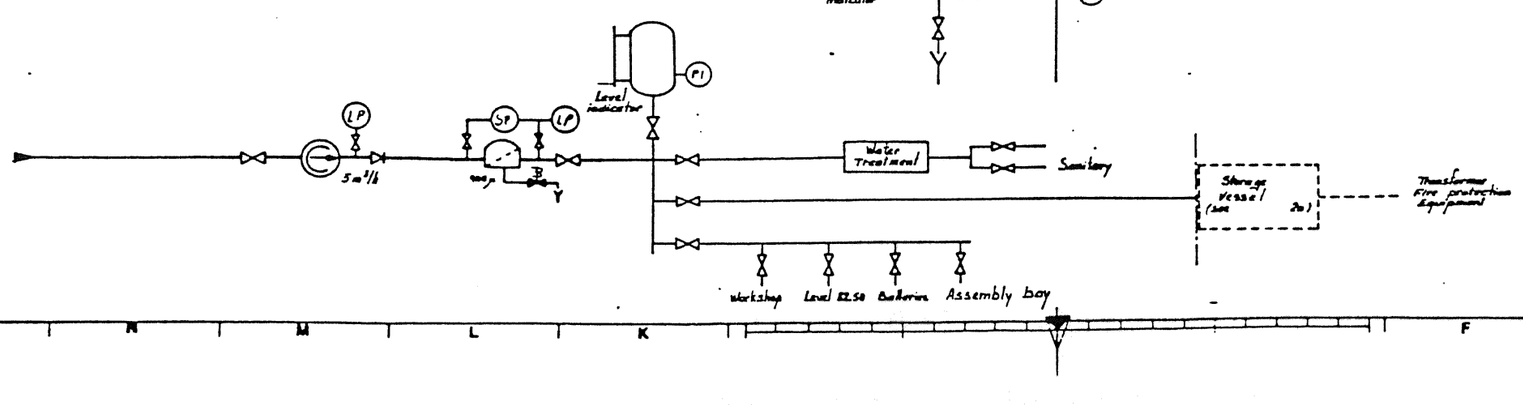
COOLING SYSTEM FOR AIR CONDITIONING



SHAFT SEAL FILTERED WATER SYSTEM



FIRE PROTECTION, SERVICE AND SANITARY WATER SYSTEM



OPEN VALVE	DELUGE VALVE	SUCTION BOX	FAN
CLOSED VALVE	BUTTERFLY VALVE	DRAIN	COMPRESSOR
HAND OPERATED	PISTON VALVE	REDUCER	PUMP
1/4 TURN OPERATED	MOTORIZED VALVE	HOSE CONNECTION	EXCHANGER
GLOBE VALVE	ELECTRO VALVE	AUTOMATIC STRAINER	PRESSURE GAUGE
GATE VALVE	REDUCING VALVE	WYE FILTER	INDICATING THERMOMETER
PLUG VALVE	STABILISATION VALVE	MANHOLE	FLOW INDICATOR
DIAPHRAGM VALVE	CHECK VALVE	FLOW LIMITOR	PRESSURE SWITCH
NEEDLE VALVE	FLAP VALVE		DIFFERENTIAL PRESSURE
SAFETY VALVE	REGULATING THREE WAY VALVE		-

AIR EXHAUST	HUMIDIFYING SECTION		AIR GRILLE OUTLET
AIR COOLER	AIR HEATER		AIR GRILLE INTAKE
AIR FILTER	AIR VALVE		DOOR GRILLE

COOLING WATER SUPPLY	OUTDOOR AIR DUCT
CHILLEDWATER SUPPLY	SUPPLY AIR DUCT
CHILLEDWATER RETURN	RECIRCULATED AIR DUCT
CONDENSER WATER SUPPLY	EXTRACTED AIR DUCT
CONDENSER WATER RETURN	

E/M

SAR N°

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

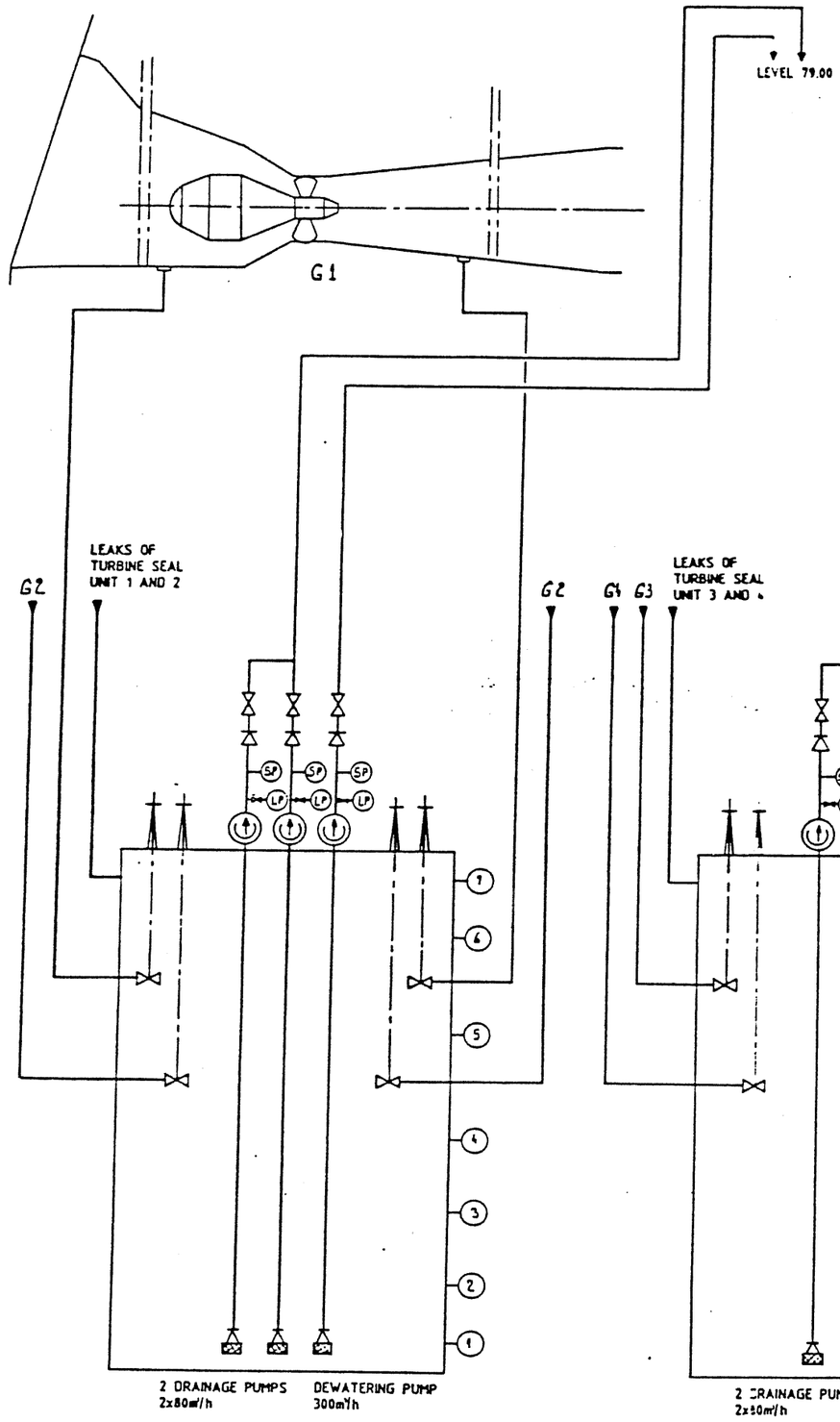
FILTERED WATER SYSTEM

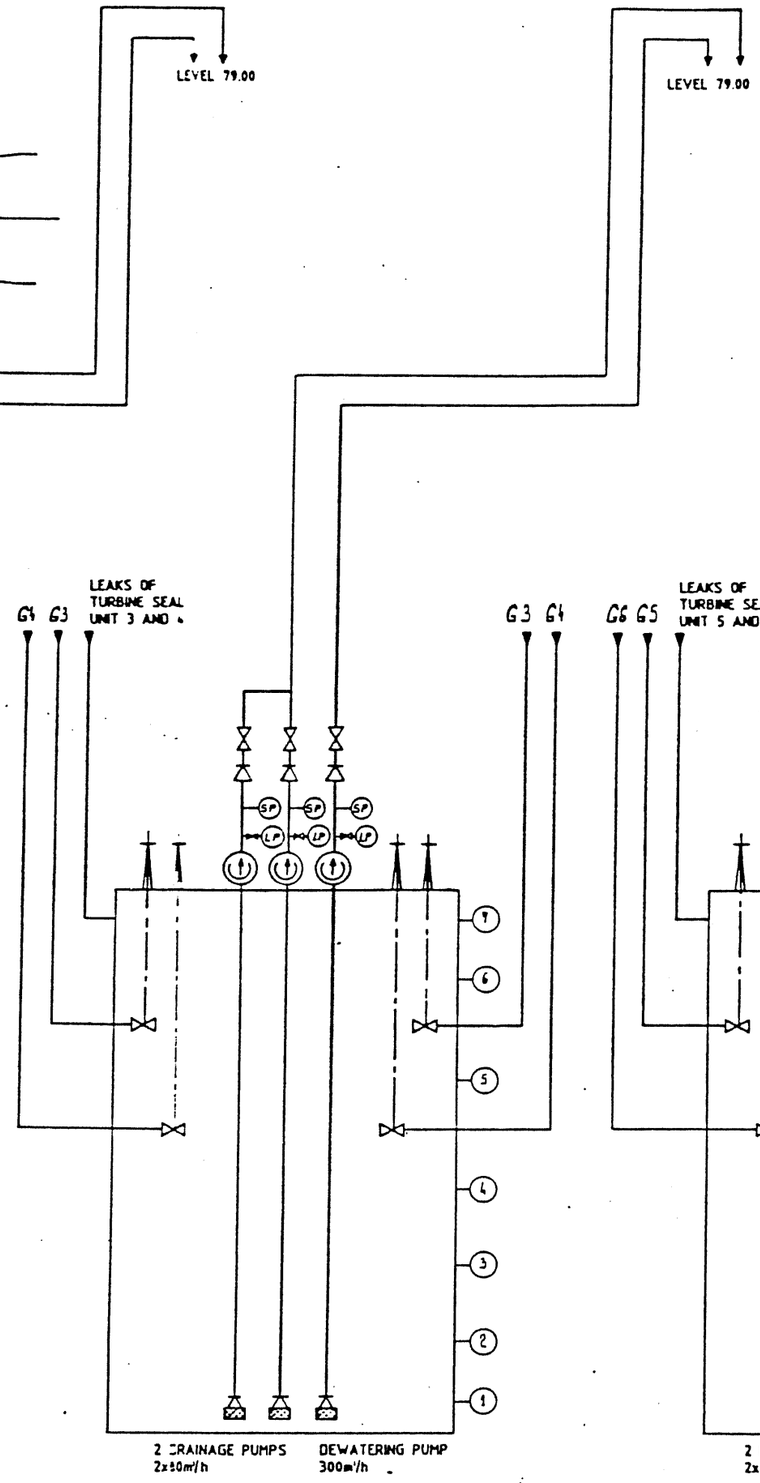
SOGREAH Ingenieurs Conseils
GRENOBLE . FRANCE

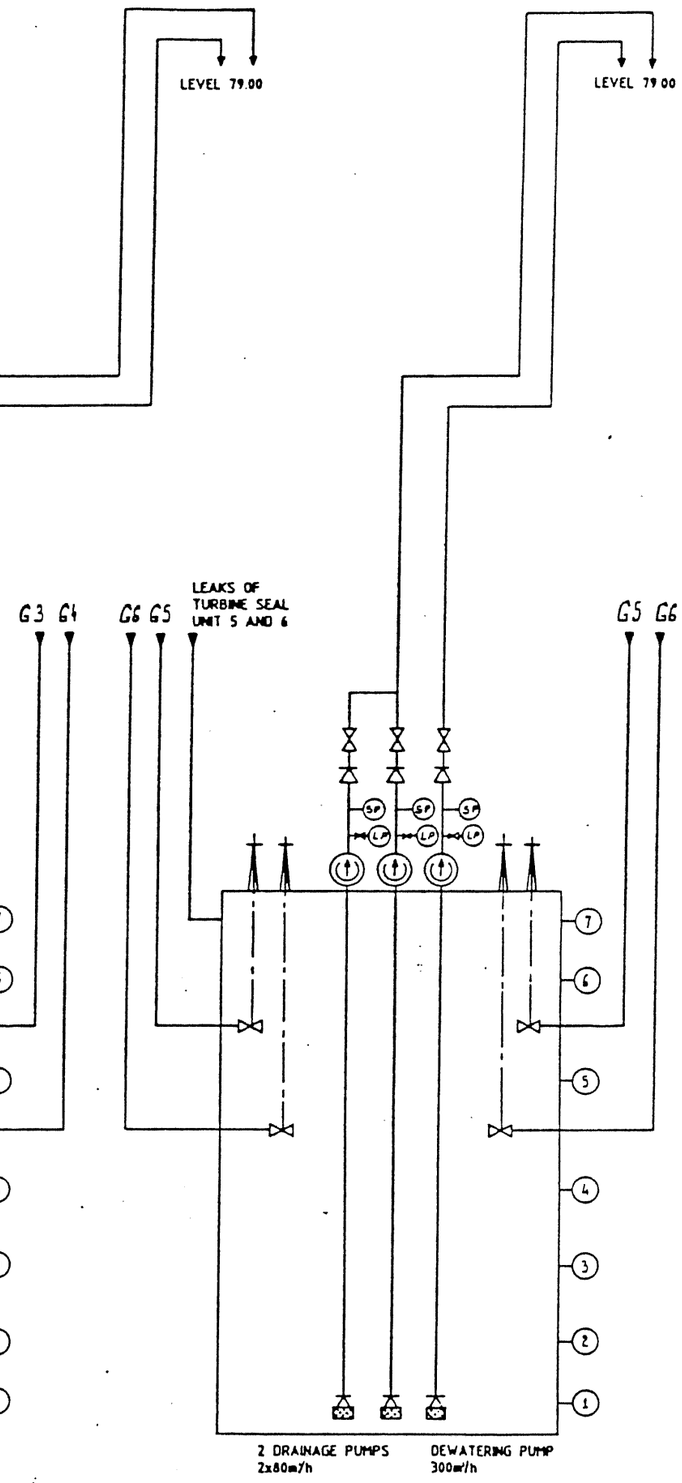
APPROVED

REPORT 34046I R4
DATE JUNE 1986

DRAWING No: NE_82







OPEN VALVE	DELUGE VALVE	SUCTION BOX	FAN	AIR EXHAUST	HUMIDIFYING SECTION
CLOSED VALVE	BUTTERFLY VALVE	DRAIN	COMPRESSOR	AIR COOLER	AIR HEATER
HAND OPERATED	PISTON VALVE	REDUCER	PUMP	AIR FILTER	AIR VALVE
1/4 TURN OPERATED	MOTORIZED VALVE	HOSE CONNECTION	EXCHANGER	COOLING WATER SUPPLY	OUTDOOR AIR DUCT
GLOBE VALVE	ELECTRO VALVE	AUTOMATIC STRAINER	PRESSURE GAUGE	CHILLEDWATER SUPPLY	SUPPLY AIR DUCT
GATE VALVE	REDUCING VALVE	WYE FILTER	INDICATING THERMOMETER	CHILLEDWATER RETURN	RECIRCULATED AIR DUCT
PLUG VALVE	STABILISATION VALVE	MANHOLE	FLOW INDICATOR	CONDENSER WATER SUPPLY	EXTRACTED AIR DUCT
DIAPHRAGM VALVE	CHECK VALVE	FLOW LIMITOR	PRESSURE SWITCH	CONDENSER WATER RETURN	
NEEDLE VALVE	FLAP VALVE		DIFFERENTIAL PRESSURE		AIR GRILL OUTLET
SAFETY VALVE	REGULATING THREE WAY VALVE		-		AIR GRILL INTAKE
					DOOR GRILL

1. LOW LEVEL
2. STOPPING OF PUMPS
3. RUNNING DRAINAGE PUMP 1
4. RUNNING DRAINAGE PUMP 2
5. RUNNING DEWATERING PUMP
6. HIGH LEVEL
7. LEVEL TOO HIGH

SARA

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

DEWATERING AND DRAINAGE SYSTEM

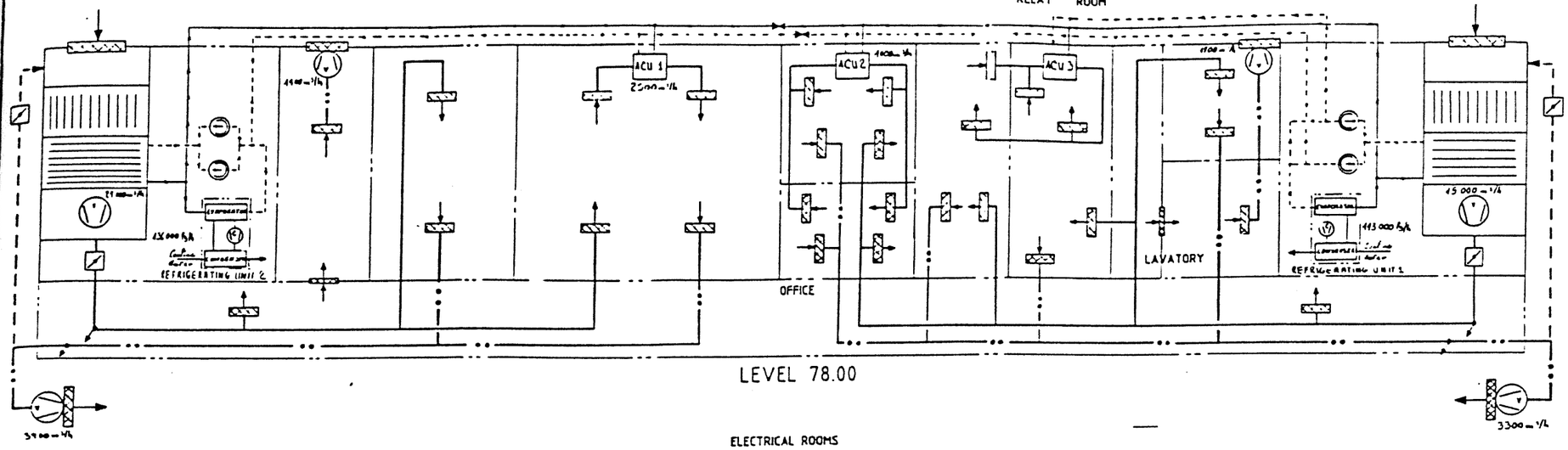
SOGREAH Ingenieurs Conseils GRENOBLE - FRANCE

APPROVED

REPORT 34046I R4

DATE JUNE 1986

DRAWING No NE_83



OPEN VALVE	DELUGE VALVE	SUCTION BOX	FAN
CLOSED VALVE	BUTTERFLY VALVE	DRAIN	COMPRESSOR
HAND OPERATED	PISTON VALVE	REDUCER	PUMP
1/4 TURN OPERATED	MOTORIZED VALVE	HOSE CONNECTION	EXCHANGER
GLOBE VALVE	ELECTRO VALVE	AUTOMATIC STRAINER	PRESSURE GAUGE
GATE VALVE	REDUCING VALVE	WYE FILTER	INDICATING THERMOMETER
PLUG VALVE	STABILISATION VALVE	MANHOLE	FLOW INDICATOR
DIAPHRAGM VALVE	CHECK VALVE	FLOW LIMITOR	PRESSURE SWITCH
NEEDLE VALVE	FLAP VALVE		DIFFERENTIAL PRESSURE
SAFETY VALVE	REGULATING THREE WAY VALVE		-

AIR EXHAUST	HUMIDIFYING SECTION	AIR GRILL OUTLET
AIR COOLER	AIR HEATER	AIR GRILL INTAKE
AIR FILTER	AIR VALVE	DOOR GRILLE

	COOLING WATER SUPPLY		OUTDOOR AIR DUCT
	CHILLED WATER SUPPLY		SUPPLY AIR DUCT
	CHILLED WATER RETURN		RECIRCULATED AIR DUCT
	CONDENSER WATER SUPPLY		EXTRACTED AIR DUCT
	CONDENSER WATER RETURN		

AIR CONDITIONING UNIT
ACU

EA

SAQ NA

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

VENTILATION AND AIR CONDITIONING SYSTEM

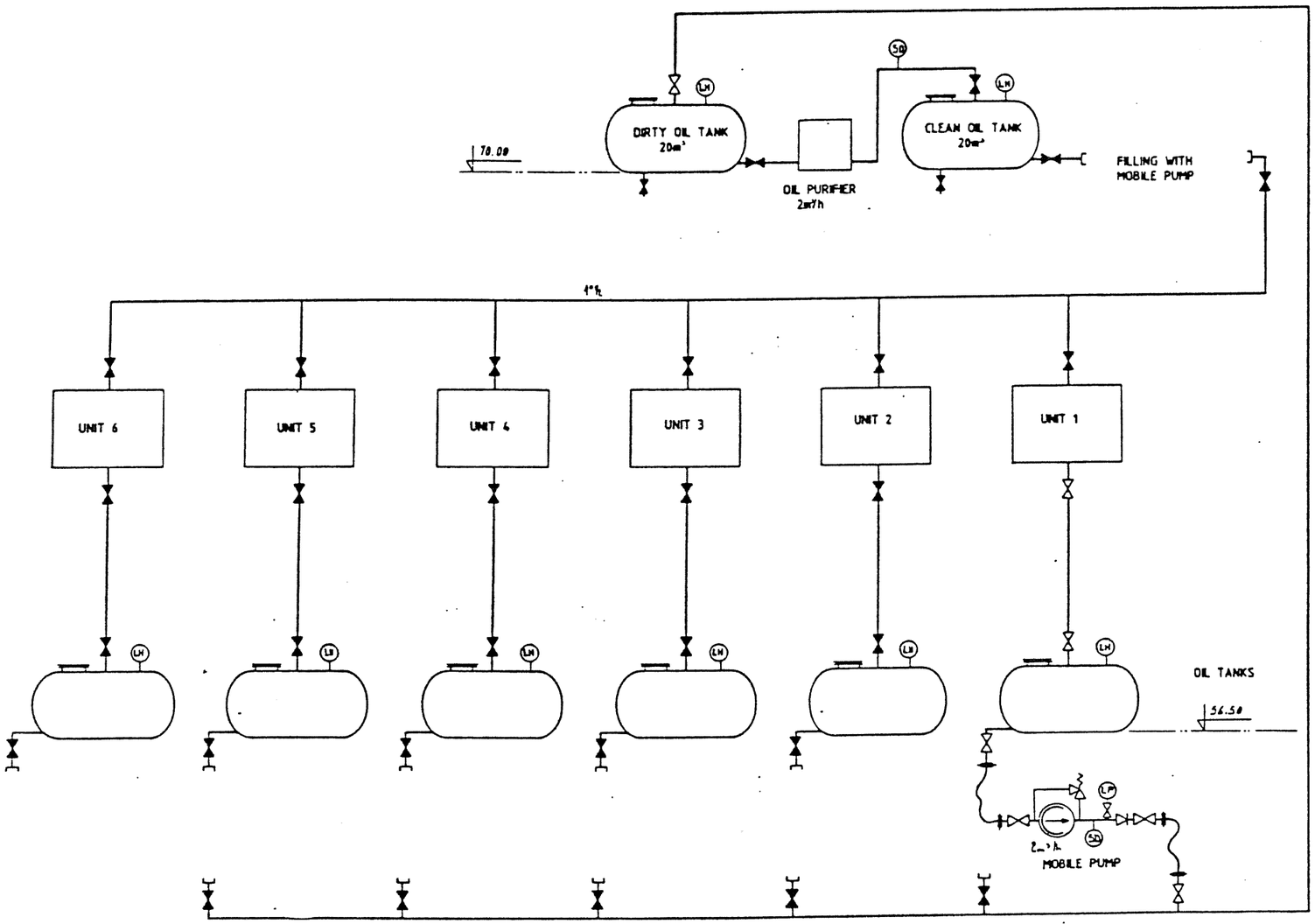
SOGREAH Ingenieurs Conseils GRENOBLE - FRANCE

APPROVED

REPORT 340461 R4

DATE JUNE 1986

DRAWING No NE_84



OPEN VALVE	DELUGE VALVE	SUCTION BOX	FAN
CLOSED VALVE	BUTTERFLY VALVE	DRAIN	COMPRESSOR
HAND OPERATED	PISTON VALVE	REDUCER	PUMP
1/4 TURN OPERATED	MOTORIZED VALVE	HOSE CONNECTION	EXCHANGER
GLOBE VALVE	ELECTRO VALVE	AUTOMATIC STRAINER	PRESSURE GAUGE
GATE VALVE	REDUCING VALVE	WYE FILTER	INDICATING THERMOMETER
PLUG VALVE	STABILISATION VALVE	MANHOLE	FLOW INDICATOR
DIAPHRAGM VALVE	CHECK VALVE	FLOW LIMITOR	PRESSURE SWITCH
NEEDLE VALVE	FLAP VALVE		DIFFERENTIAL PRESSURE
SAFETY VALVE	REGULATING THREE WAY VALVE		-

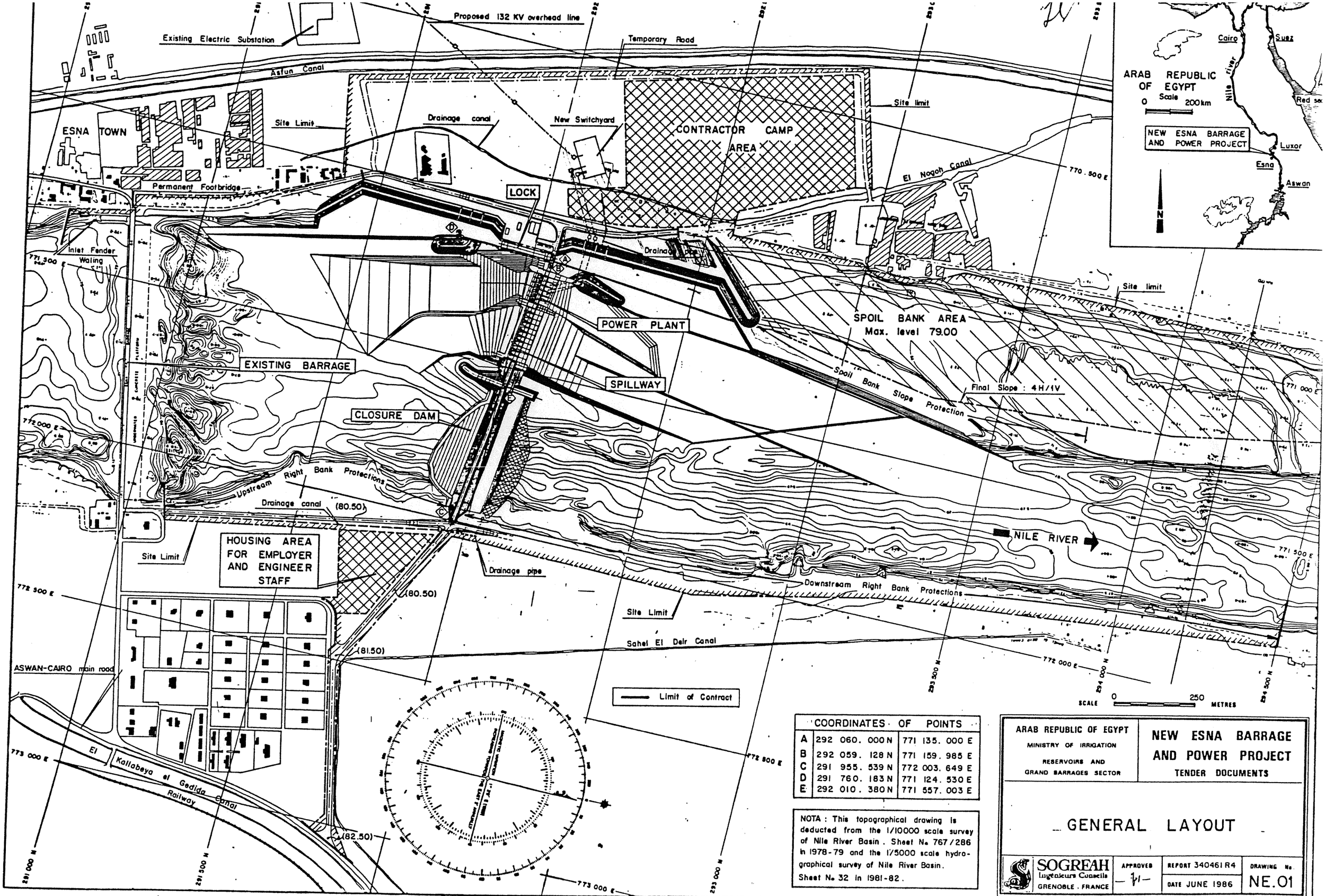
AIR EXHAUST	HUMIDIFYING SECTION		AIR GRILLE OUTLET
AIR COOLER	AIR HEATER		AIR GRILLE INTAKE
AIR FILTER	AIR VALVE		DOOR GRILLE

COOLING WATER SUPPLY		OUTDOOR AIR DUCT	
CHILLEDWATER SUPPLY		SUPPLY AIR DUCT	
CHILLEDWATER RETURN		RECIRCULATED AIR DUCT	
CONDENSER WATER SUPPLY		EXTRACTED AIR DUCT	
CONDENSER WATER RETURN			

E.M.

SAQ NA

ARAB REPUBLIC OF EGYPT MINISTRY OF IRRIGATION RESERVOIRS AND GRAND BARRAGES SECTOR	NEW ESNA BARRAGE AND POWER PROJECT TENDER DOCUMENTS		
MAINTENANCE EQUIPMENT LUBRICATING OIL TREATMENT			
SOGREAH Ingénieurs Conseils GRENOBLE - FRANCE	APPROVED	REPORT 340461 R4 DATE JUNE 1986	DRAWING No. NE_85



COORDINATES OF POINTS		
A	292 060. 000 N	771 135. 000 E
B	292 059. 128 N	771 159. 985 E
C	291 955. 539 N	772 003. 649 E
D	291 760. 183 N	771 124. 530 E
E	292 010. 380 N	771 557. 003 E

NOTA : This topographical drawing is deducted from the 1/10000 scale survey of Nile River Basin. Sheet N. 767/286 in 1978-79 and the 1/5000 scale hydrographical survey of Nile River Basin. Sheet N. 32 in 1981-82.

ARAB REPUBLIC OF EGYPT
MINISTRY OF IRRIGATION
RESERVOIRS AND GRAND BARRAGES SECTOR

NEW ESNA BARRAGE AND POWER PROJECT
TENDER DOCUMENTS

GENERAL LAYOUT

SOGREAH Ingenieurs Conseils GRENOBLE . FRANCE

APPROVED

REPORT 340461 R4

DATE JUNE 1986

DRAWING No. NE.01